SOUTHERN POWER AND INDUSTRY

Ad Index, page 100 APRIL, 1952

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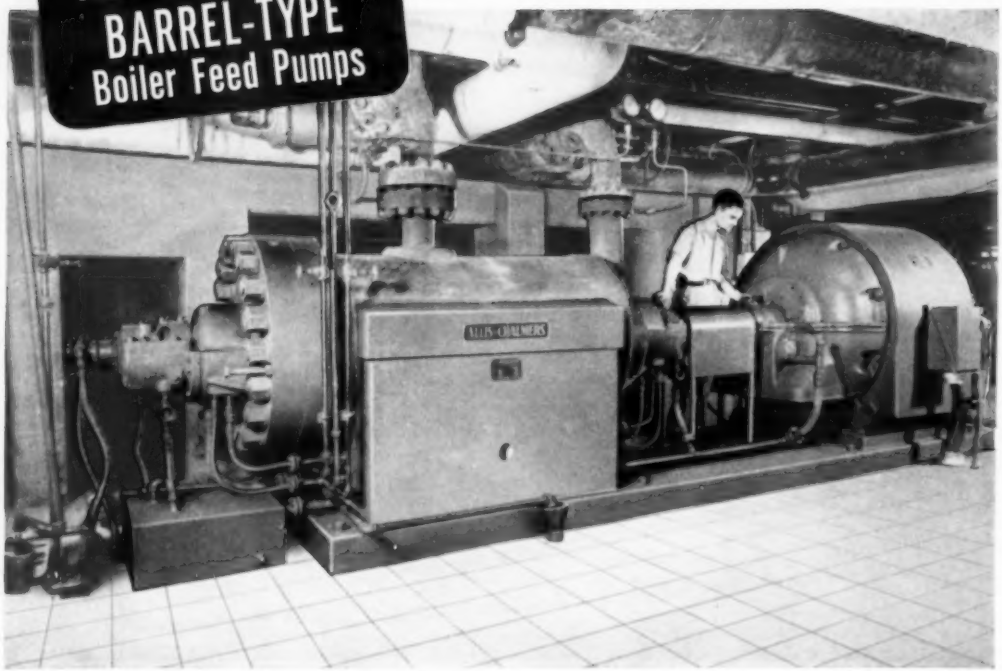
ALLIS-CHALMERS
BARREL-TYPE
Boiler Feed Pumps



Install New Boiler Feed Pumps at South Carolina Electric and Gas

WHEN 50,000 KW CAPACITY WAS ADDED to Plant Hagood, South Carolina Electric and Gas Company, Charleston, South Carolina, this well know utility chose Allis-Chalmers barrel-type boiler feed pumps. The installations consists of two units like the one shown above. The pump is a 6x6, 11 stage rated at 485,000 lbs/hr or 1055 gpm at a total head of 4100 feet or 1630 psig. Water temperature is 300° F. The motor is an Allis-Chalmers two pole machine rated 1250 hp at 3575 rpm.

Allis-Chalmers barrel-type boiler feed pumps are proving their reliability and low cost of operation in a number of similar installations. Performance records have been such that more than 60 have been ordered for plants now being built.

Engineering Features

Proved engineering features mean you can depend on good performance and low maintenance. Single-stage back-to-back impellers balance axial forces without the use of a balancing drum. First stage has twin, half-capacity impellers to give the advantages of low NPSH. Expansion joint is on the outside of the pump. No flexible internal members are required to compensate for expansion.

Sizes range from 1200 to 3000 psig and from 300 to 2500 gpm. Allis-Chalmers can supply the complete boiler feed pump package including pump, motor, and control of coordinated design and manufacture.

Get the details of this modern-design, performance-proved boiler feed pump from your Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3672

ALLIS-CHALMERS

SOUTHERN POWER & INDUSTRY is published monthly at 56th & Chestnut Sts., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co.
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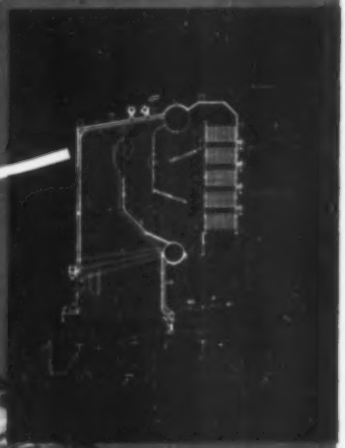
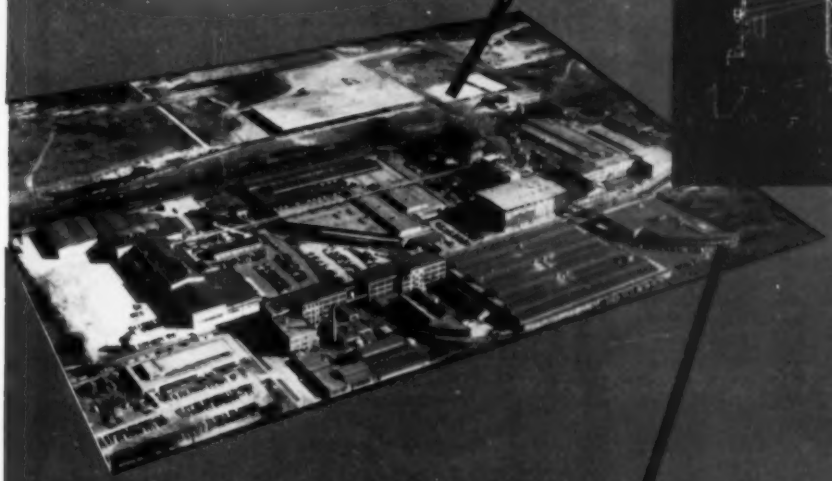
Volume 70 Number 4

SUTHERLAND PAPER COMPANY installs 12th WICKES STEAM GENERATOR





The new WICKES boiler in SUTHERLAND'S Michigan plant produces 120,000 lbs. steam per hour at 475 lbs. pressure and final steam temperature of 650° F.

Like so many industries and institutions that require steam, the SUTHERLAND PAPER COMPANY with plants in Kalamazoo, Michigan, and Santa Clara, California, has learned to depend on WICKES for efficient steam production. That's why they've just installed their twelfth WICKES boiler in 33 years of successful paperboard manufacture. The new WICKES boiler at the SUTHERLAND PAPER COMPANY is fired by spreader stoker but these units are readily adaptable to any standard method of firing. It is equipped with a superheater and an economizer and the design makes it especially practical where space is limited. WICKES can fill your needs for steam generators up to 250,000 lbs. per hour and 1000 psi. Write today for descriptive literature or consult your nearest WICKES representative.

WICKES

138

THE WICKES BOILER CO., SAGINAW, MICHIGAN • DIVISION OF THE WICKES CORPORATION
RECOGNIZED QUALITY SINCE 1884 • SALES OFFICES: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Greensboro, N.C. • Houston • Indianapolis • Los Angeles • Memphis • Milwaukee • New York City • Pittsburgh • Portland, Ore. • Saginaw • San Francisco • Springfield, Ill. • Tampa, Fla. • Tulsa • Washington, D.C.

TURBINE OIL STILL GOOD AS NEW AFTER 34,498 HOURS OPERATION...

TEXACO REGAL OIL (R&O) keeps Kentucky Utilities Company turbines "on the line"

"We have used *Texaco Regal Oil (R&O)* with perfect results and not a single difficulty," says Mr. Bryan Bunch of Kentucky Utilities Company, Tyrone, Ky. "The oil has never been changed since turbines were installed and recent tests show it to be as good as new."

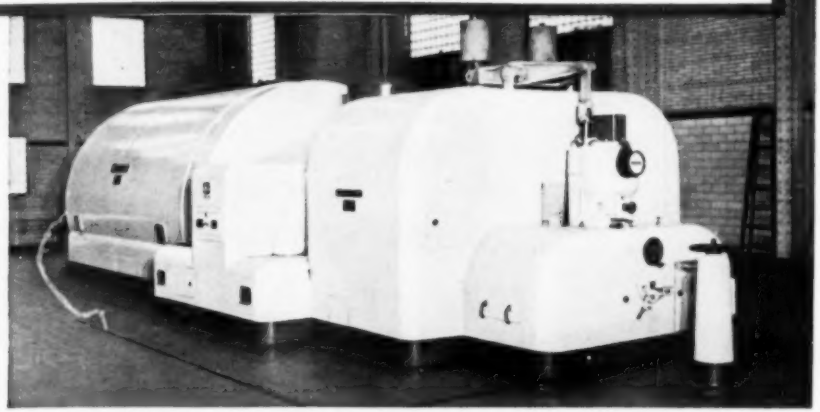
Kentucky Utilities has two 25,000 KW turbines. No. 1 has been operated for 34,498 hours, No. 2 for 28,547 hours. Both run most of the time at full load, occasionally are overloaded.

Ability of *Texaco Regal Oil (R&O)* to stand up under severe load conditions and keep turbines free of rust, sludge and foam, springs from the fine quality of the base stocks used. These are carefully refined, fortified with special Texaco additives and specially processed to make them *more than ten times as oxidation-resistant* as ordinary turbine-quality oils and vastly more resistant to rust and foaming.

There is a complete line of *Texaco Regal Oils (R&O)*, all designed to give your turbines extra protection throughout an extra long service life. They more than meet the stringent requirements of all leading turbine builders.

Let a Texaco Lubrication Engineer show you in detail the cost-saving advantages of Texaco lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



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FOR ALL TURBINES

Faithfully yours 50 *for Fifty Years*

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SOUTHERN POWER AND INDUSTRY

APRIL 1952

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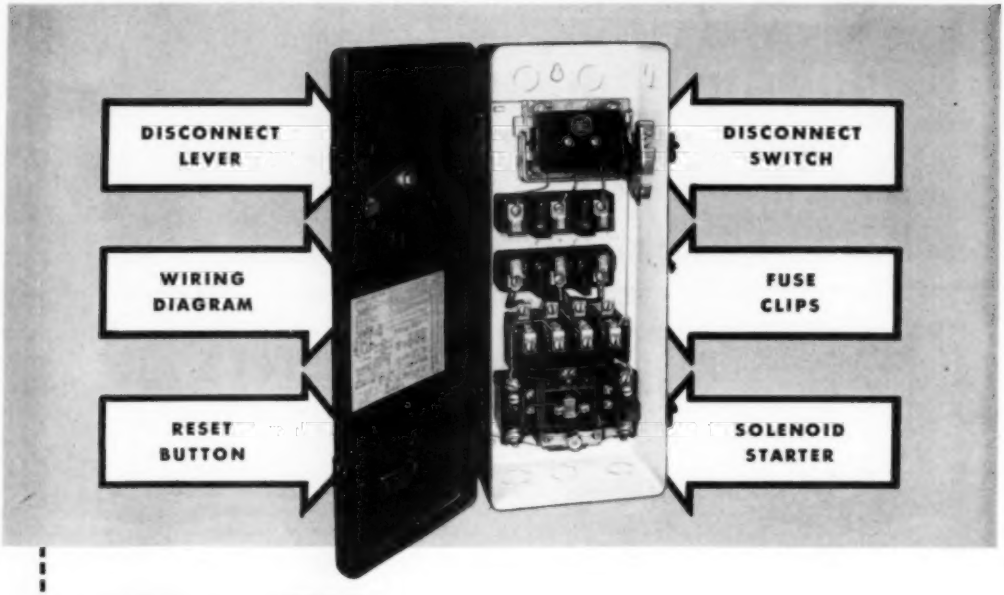


Starter with lever locked in OFF position with three padlocks for safety to maintenance men.

Bulletin 712 combination starter in watertight cabinet.

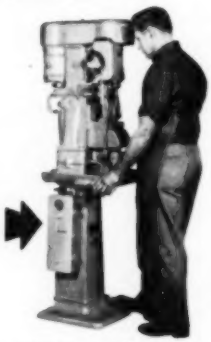
Where Wiring Space Is "TIGHT"

. . . use Bulletin 712 Combination Starters

Compactness . . . that is a requirement of modern motor control. Do away with the old style disconnect switches and starters hanging all over your machines and factory interiors. Simplify your wiring jobs . . . make neater installations . . . with A-B combination starters that have all units—disconnect switch, fuses, and motor starter—in a single cabinet. There is greater safety, too. The interlocked disconnect lever must be in OFF position to open cabinet. Starter is then "dead."

Send for Bulletin 712-713 on A-B combination starters—with fused or nonfused disconnect switches, or with circuit breakers.

Allen-Bradley Co.
1328 S. Second St., Milwaukee 4, Wis.



Kingsbury drilling and countersinking machine with Bulletin 712 starter.

ALLEN-BRADLEY SOLENOID MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

April, 1952

► POWER PLANT PROBLEMS? Unsatisfactory smoke control, need for additional large quantities of steam, and high and sudden changes in load requirements, were some of the problems facing Bernheim Distilling Co. engineers in Louisville, Kentucky. Robert Cooper, Bernheim instrument engineer, reports on corrective measures taken, in this issue of SP&I. Cost data and savings are tabulated.

Modernization phases reported include new boiler installation, operating training course, revamped and changed combustion controls, change in size of coal, overfire and underfire air change, and a revamped system in order to eliminate dust in removal and handling of ashes.

► HOW ROUTINE SCHEDULED MAINTENANCE plus modern machinery and methods pay off in industrial plant operation will be reported in SP&I's 6th Annual Plant Maintenance issue next month by C. H. Smith, general superintendent of the Southern area, General Mills, Inc. Discussion will feature the highlights of a ten year plant modernization program at the Oklahoma City flour mill of General Mills, Inc.

Several features of the extensive program, which has already simplified maintenance problems, reduced breakdown time, and improved plant appearance, include conversion to individual motor drives from line-shaft power distribution system, conversion to purchased power, modern switchboard equipment, and an automatic piped fumigation system.

► METAL REMOVAL BY SPARK DISCHARGE permits rapid and accurate cutting of such materials as hardened steel and tungsten carbide. In the process of the Method X Company (affiliate of Firth Sterling Steel & Carbide), a succession of high current sparks are made to pass between the work piece and an electrode having the shape of the hole which it is desired to pierce through the work piece.

Design: Machine similar to a drill press — pedestal base, an electrode feed and control mechanism and remote power supply. Cutting operation is submerged in a dielectric fluid such as fuel oil. Fluid carries away the dislodged metal particles from work surface.

Operation: Designs shaped directly into metal by feeding electrode into workpiece. Eroded end of electrode is cut off, electrical controls adjusted, and electrode again fed into previously rough shaped hole for finishing operation. Accuracy of 0.0005" is claimed possible. As metal removal action is mechanical rather than thermal, physical and chemical properties are not affected.

► SOLDERING ALUMINUM has not yet progressed to the stage where it can be done as easily as soldering steel, brass, copper or tin. However, with proper materials and methods, it is entirely practicable to join many aluminum assemblies by soldering. Size of the parts being joined is the critical factor. Small parts can be soldered; large parts still await development of a practical method.

An analysis of the factors involved in soldering aluminum and how to utilize presently available procedures and materials most effectively, is covered in Reynolds No. 17 Technical Advisor — Write Reynolds Metals Co., 2500 So. Third St., Louisville 1, Kentucky, for a complimentary copy.

► GOUGING AND CUTTING TORCH, a little over 10 in. in overall length, and operating on an ordinary 300 – 400 amp d-c welding machine and a compressed air line, is claimed to cut or bevel mild steel, stainless steel, and hard alloys at speeds equal to the oxygen-acetylene torch and at less cost. In one test the new Arcair torch cut a groove 3 ft long, 3/8 in. wide, and 1/4 in. deep in one minute.

It is not much larger than an arc welding electrode holder and contains an air control valve and rotating nozzle which permits changing electrode angle to suit the job. No gas cylinders or regulators are necessary. Air and current are brought to the torch through a concentric cable. In some foundry operations, one Arcair cutter has replaced three chippers. Additional applicational data will be featured in May -- SP&I's 6th Annual Plant Maintenance issue.

► NEW LINE OF FRACTIONAL HORSEPOWER MOTORS by General Electric is announced in the New Equipment section of this issue. The smaller and lighter Form G motors are available in open dripproof and totally enclosed fan-cooled models in polyphase, capacitor start, split phase, and permanent split capacitor types. The Form G motor weighs as much as 51 per cent less per horsepower than the models it replaces and is considerably smaller in size. Versatility of application has been broadened. Check the New Equipment section for applicational data.

► THE SOUTHERN INDUSTRIAL DIRECTORY, compiled by the S.A.S.I. is ready for mailing. The four part volume will carry a COMPANY INDEX of over 3,000 principal manufacturing plants, products, and names of officials; PRODUCT INDEX, similar to classified section of a telephone directory, listing materials, supplies, services, and equipment available from Southern firms; GEOGRAPHICAL INDEX of major manufacturing plants in 14 Southern and Southwestern states; and a REFERENCE SECTION, including directory of consulting research institutes, industrial development agencies, and other sources of data on regional activities. The Southern Industrial Directory is $5 per copy. Write H. McKinley Conway, Jr., director of the Southern Association of Science and Industry, 5009 Peachtree Rd., Atlanta, Georgia.

► WHAT'S A SILICONE? To answer that question, Dow Corning Corporation has gathered over ten tons of equipment, including working demonstrations, component parts, sections, cut-aways, samples and finished products, into the largest and most comprehensive display of silicones ever assembled. Known as the Dow Corning Silicone Exposition, the display is scheduled to be shown in April to executive, engineering and technical personnel in Wichita, Kansas, and Fort Worth and Houston, Texas.

The unique properties of the silicones will be demonstrated. For instance, Silastic, the silicone rubber, is the same at -100 F as it is at 500 F. Bellows of Silastic will be subjected to continuous flexing in baths of hot oil and of dry ice. Samples of silicone varnished glass cloth will be placed on a hot plate held at 450 F. Silicone grease is compared to organic grease in paired bearings set in blocks held at 300 F and at -75 F.

While in the Southwest, the Dow Corning Silicone Exposition will be under the direction of M. H. Leavenworth, district manager, 2722 Taylor Street, Dallas, Texas. Preview of the show was featured on pages 128 – 129 of the March issue. For exhibiting dates in Wichita, Kansas, and Fort Worth and Houston, Texas, check the Future Events of Engineering Interest tabulation in this issue.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

HERE'S YOUR *Complete* STEAM PLANT

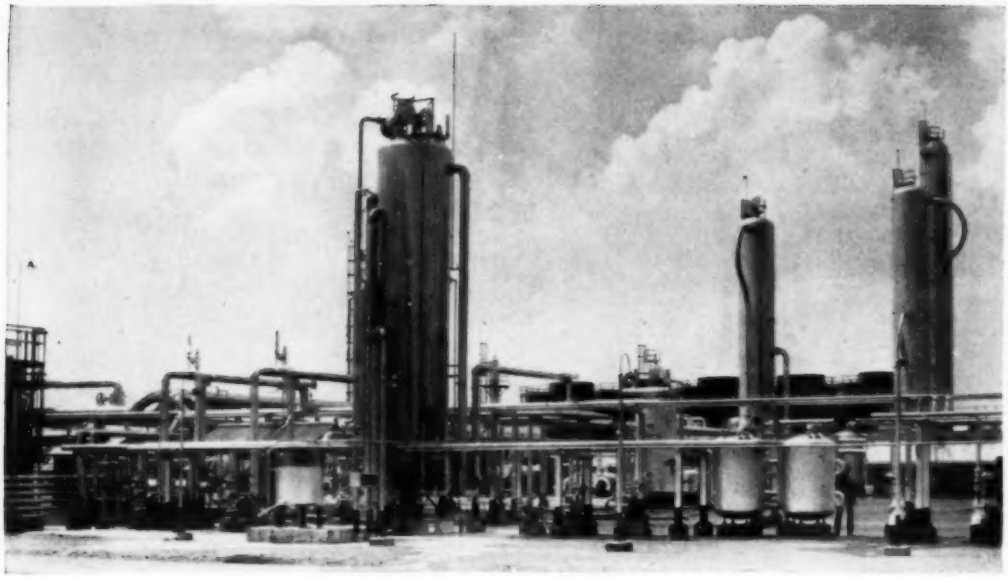
- One purchase, backed by undivided responsibility.
- Shipped completely assembled after factory tests to assure highest operating efficiency.
- More than 80% thermal efficiency guaranteed.
- 4-pass design provides 5 sq. ft. of heating surface per b.h.p.
- Induced draft fans which are built-in eliminate the need of an expensive chimney.
- Simple installation requires no special foundation.
- Clean, quiet operation.
- Heavy-duty, rugged construction assures long-lived dependability.
- Burner equipment to suit your fuel: gas, oil or both.
- 18 sizes from 20 to 600 b.h.p. for pressures up to 250 p.s.i., or for hot water heating.
- For complete details, write today for catalog 411.

SUPERIOR STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES, Inc.

Factory: Emmaus, Pa.

Executive Offices: Times Building, Times Square, New York 18, N. Y.



NORTH COWDEN GASOLINE PLANT near Odessa, Texas, operated by Stanolind Oil and Gas Company. Here Worthington Water Softeners protect boilers from scale-forming deposits.

Worthington softeners protect this plant's boilers 10 ways

In this case, it's a hot-process softener to remove scale-forming deposits from boiler feedwater.

Let's examine this gasoline plant installation and see how it gives boilers "maximum" protection:

1. *Feed water is softened* by a hot-lime soda system.
2. *Selective deaeration* for operation on make-up only, condensate only, or both.
3. *Non-scaling direct-contact vent condenser* heats and vents treated make-up.
4. *Tubular vent condenser vents condensate.*
5. *Oxygen contamination of feedwater avoided* by last-step deaeration.
6. *Stainless steel deaerating elements.*
7. *Uniform and efficient deaeration* during wide load swings.
8. *Filter backwashing* with clean, hot, chemically inert water without velocity change through the softening zone.
9. *Proportionate sludge removal.*
10. *Uniformly proportionate chemical feed.*

Before you buy, investigate Worthington Water Softening Systems thoroughly. Tell us the service conditions, and get our recommendations in terms of dollars and benefits. We're certain you'll learn that *there's more worth in Worthington.* Write Worthington Pump and Machinery Corporation, Water Treating Section, Harrison, N. J.

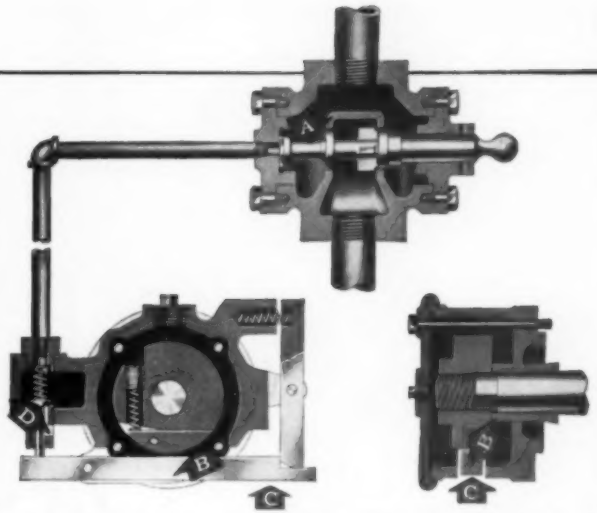
J.1.4

Worthington Makes More of the Equipment for ALL Types of Water Conditioning Systems

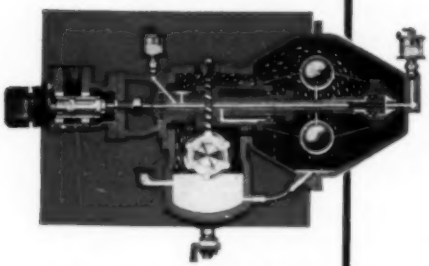
WORTHINGTON

Water Conditioning

Only Coppus Turbines offer you *a pilot operated* excess speed safety trip



The constant speed governor on Coppus Turbines, plus this Excess Speed Safety Trip, gives you extra protection for your turbine investments. Here's how it works. When steam is turned on, pressure opens valve A fully. When excess speed is reached, centrifugal force throws weight B against lever C lifting pilot valve D. This releases pressure in back of valve A, closing this valve instantaneously, to shut off the steam. Safety trip can be tested easily while turbine is running by manually tripping and resetting lever C.



Sectional view showing lubricating system of fully enclosed Coppus Constant Speed Governor. Governor head acts directly on stem of steam admission valve. No external levers required. Ball bearing construction eliminates end play and gives frictionless operation.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

CUT YOUR COSTS PER HORSEPOWER

When you choose from the Coppus Steam Turbine line, you get the right size for your requirements . . . and make substantial savings on *any* size from the 150 hp turbine down to the smallest. Low in first cost, Coppus Turbines save you more money in the long run. Operating and maintenance costs are kept low by such other features as: large number of steam nozzles, controlled individually by manually operated valves; hard chromium plating on shaft at the stuffing box; replaceable cartridge type bearing housings; optional carbon ring packing assembly for back pressures up to 75 pounds.

WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORPORATION, 244 Park Ave., Worcester 2, Mass. Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES

Mr. William Hartfel, Chief Electrician,
Trent Tube Mfg. Co., East Troy, Wisconsin
Division of Crucible Steel Co. of America

"By replacing ordinary fuses with Fusetron fuses

WE WIPED OUT NEEDLESS FUSE BLOWS

"We have a 1200 ampere switch with a grounded neutral on our 220 volt, 3 phase system. To handle the load of approximately 1000 amperes, we used two 600 ampere fuses in parallel.

"These fuses gave us a lot of trouble by blowing two or three times a week. Each blow meant a shutdown that caused a loss in production.

"In the early part of May, about two months ago, we decided to try out Fusetron dual-element fuses.

"These fuses completely wiped out needless fuse blows and what is more important they eliminated the costly interruptions of operating schedules."

Don't Risk Losses in Your Plant

One **needless** shutdown — One **lost** motor
One **destroyed** panel or switch
One **burned out** solenoid

May cost you more than replacing every ordinary fuse with a FUSETRON dual-element Fuse.

But, simply knowing that FUSETRON fuses do save money is knowledge — but it isn't action.

By passing the word along that all purchase and stock records should call for FUSETRON dual-element fuses, you have action that begets money saving.

IN A 1200 Amp. SWITCH

and stopped production shutdowns that had been occurring two or three times a week."

Fusetron DUAL ELEMENT Fuses

Provide NOT ONLY SHORT CIRCUIT *But* 10 Point Protection

1. Protect against short-circuits.*
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating—lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnout.

*Fusetron fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December 1947.

Send the Coupon for more facts

Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo. (Division of McGraw Electric Co.)
Please send me complete facts about FUSETRON dual-element Fuses.

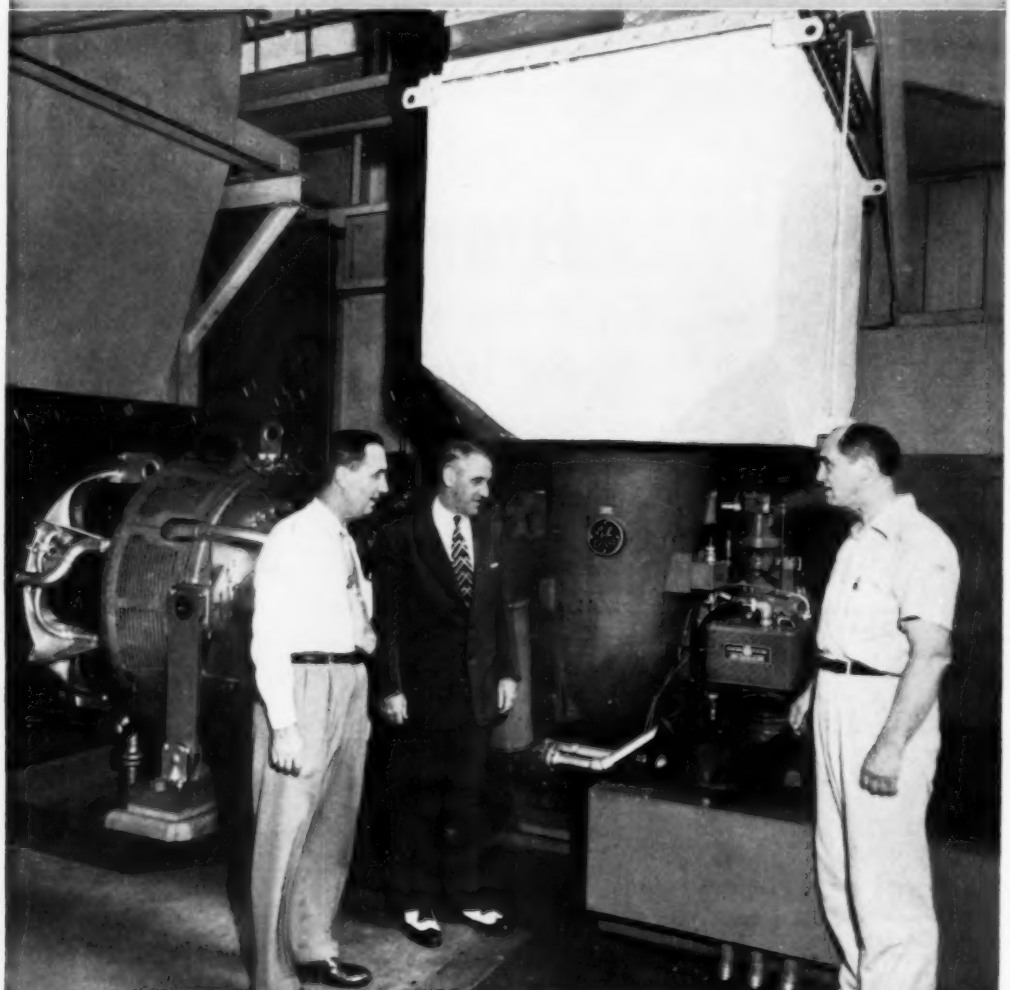
Name _____ Title _____
Company _____
Address _____
City & Zone _____ State _____ 352

(Fusetron is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.)

G-E Gas Turbine Maintains

Total Installed Hours	22,692
Hours in Service	19,541
Total Power Produced in KWH	86,712,000
Average Load	4437 KW
Hours Scheduled Out	3117
Hours Forced Out	37
Unit Capacity Factor	*126.8%

*A duplicate unit is being installed in this station.



Donald S. Kennedy, President of Oklahoma Gas and Electric, inspects the 3500-kw combustion-gas-turbine at the Belle Isle Station with C. C. Willis (extreme left) Superintendent of Generation at O.G. & E. and G. D. Conley (extreme right), Chief Engineer at Belle Isle Station.

Successful Record at Belle Isle*

"Surpassed Expectations" says Donald S. Kennedy, President of Oklahoma Gas and Electric.

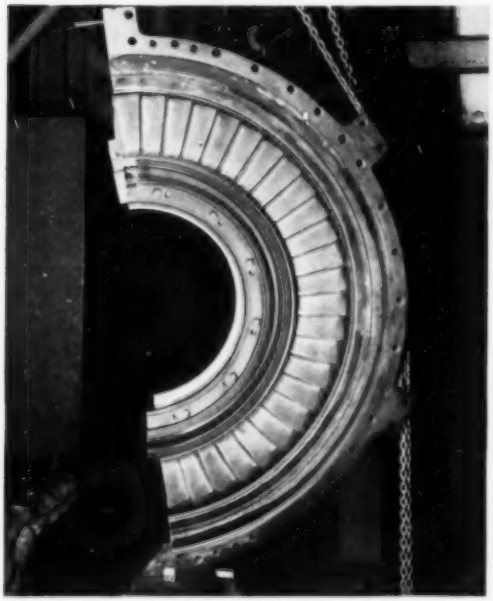
The first combustion-gas-turbine to be placed in commercial service in America continues its record of successful operation at the Belle Isle Station of the Oklahoma Gas and Electric Company. On the line since July 29, 1949, the 3500 kw unit has established a record which has surpassed contract commitments for both capacity and economy.

Donald S. Kennedy, President of the Oklahoma Gas and Electric Company, hailed the unit as eminently successful. "The combustion-gas-turbine at Belle Isle has been easily operated and maintained by our regular plant personnel. Maintenance costs have been lower and kilowatt output higher than we had anticipated. The output has averaged well over 100 per cent. Availability has been consistently high with only thirty-seven hours forced outage, due largely to the failure of a lube oil pump impeller. For availability, economy, and capacity, our gas-turbine has surpassed expectations."

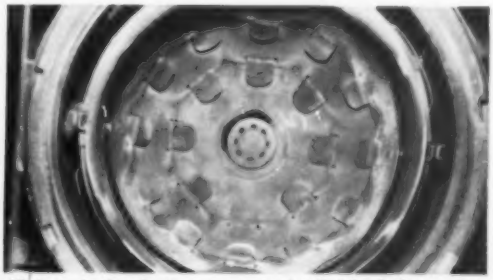
General Electric combustion-gas-turbines are available in both 3500 kw and 5000 kw ratings. For complete details call your nearest G-E sales office or write for Bulletin GEA-5516, "Gas Turbine Power Plants." General Electric Company, Schenectady 5, New York.

11,823-HOUR INSPECTION REVEALS EXCELLENT OPERATING CONDITION

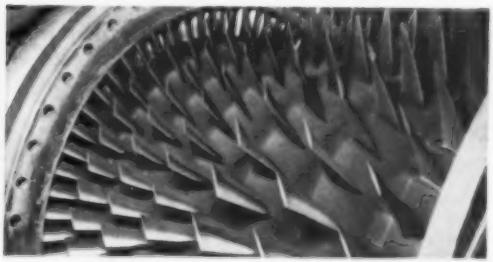
A routine semi-annual inspection of the Belle Isle gas turbine was held in March, 1951. This careful check-up on all original parts failed to uncover any major components —either rotating or combustion—which required replacement.



This half-section of the second-stage nozzle diaphragm had undergone almost no deterioration in twenty months of service. Its condition, typical of all diaphragm pieces, warranted no maintenance.



All six combustion chamber caps were reinstalled for further service. The discoloration around the gas fuel nozzle of this cap is a deposit of noncombustible residue from the fuel.

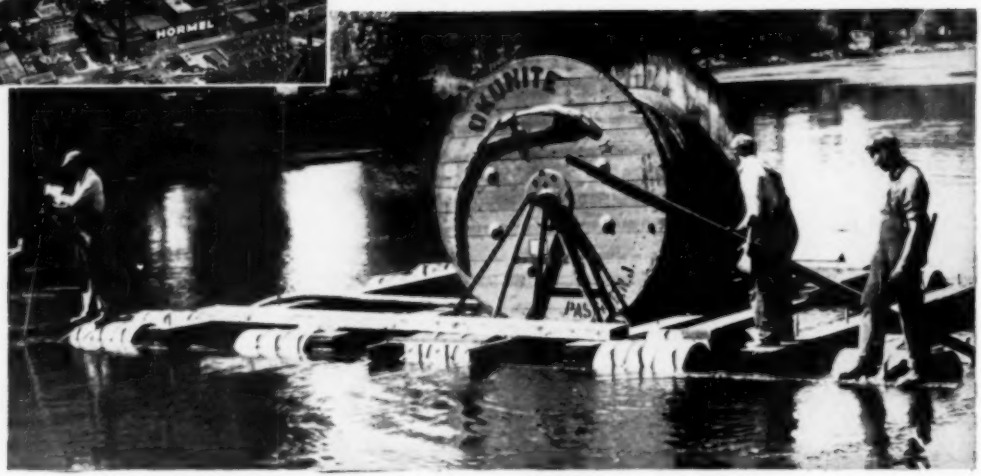


The compressor rotor, shown here with the top half of the casing removed, had collected a slight amount of dirt but was otherwise in original condition.

GENERAL ELECTRIC

255-5

HORMEL Makes Sure



...with OKOLITE cables

Costly perishables depend on uninterrupted power transmission

At Hormel's plant in Austin, Minn.—home of famous "SPAM"—thousands of dollars worth of meat are constantly being processed. Any breakdown or stoppage of electrical service would cause a tremendous loss.

When Hormel enlarged its electrical requirements, engineers installed two 13.8 kv Okolite submarine cables to convey power from the municipal plant across the Red Cedar River to the Hormel switchboard. Cables were laid from a raft specially constructed to clear obstructions in the river.

Here are some of the reasons why Okolite-insulated cable was chosen for this important installation:

Long-lived, electrically-strong Okolite insulation resists corona cutting, heat and moisture, requires no lead sheath, even when totally submerged. Okolite has an outstanding record in submarine cable service for voltages up to 35,000 volts.

All Okolite-insulated cables, whatever their end use, are subjected to super-voltage a-c and d-c tests considerably in excess of industry specifications.

On any installation where uninterrupted service is imperative, Okonite is your best cable buy—to be sure. The Okonite Company, Passaic, N. J.

OKONITE SINCE 1878 *insulated wires and cables*

THE BEST CABLE IS YOUR BEST POLICY

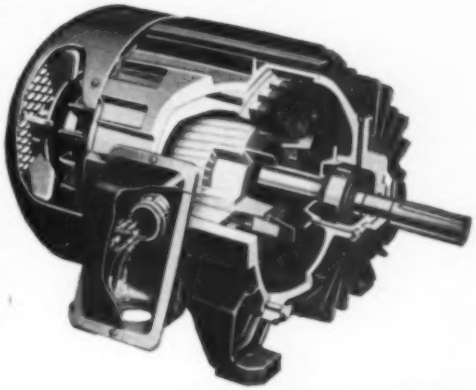
9409

Totally-Enclosed Fan-Cooled MOTORS

Look Outside

Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

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HERE IS A MOTOR that is different from conventional TEFC motors; built with an entirely different cooling system that gives you big savings in lower maintenance, more continuous service and less trouble in the toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZ TEFC motor since areas that might collect dirt are exposed and easy to clean.

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601	618	633	651	652	702	717	761	768	770	772	805	831	837	861	870
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Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

It's better
to be right
the first time
If you install a valve that's not precisely suited to the service, it will not last.
But you can be right the first time with Powell Valves because they're designed to meet specific flow control conditions.
There are more specifically adapted Powell Valves in use today than any other make.
The Wm. Powell Co.
Cincinnati 22, Ohio
Fig. 16003 W. E. 600-pound, Cast Steel Pressure Seal Gate Valve with welding ends. A Powell design for the modern Power Plant.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES

The VU Story

revealing the breadth of C-E's current

When you buy a boiler the manufacturer's long experience is a very important consideration, and Combustion has that. But even more significant is *current* experience . . . experience in meeting steam requirements similar to yours. And Combustion has that, too.

Here is a comprehensive picture of contracts placed for C-E Vertical-Unit Boilers during 1951. What it adds up to is that VU Boilers have nationwide and worldwide acceptance . . . that 1951 contracts represent a full range of capacities, pressures and temperatures and virtually every fuel and method of firing.

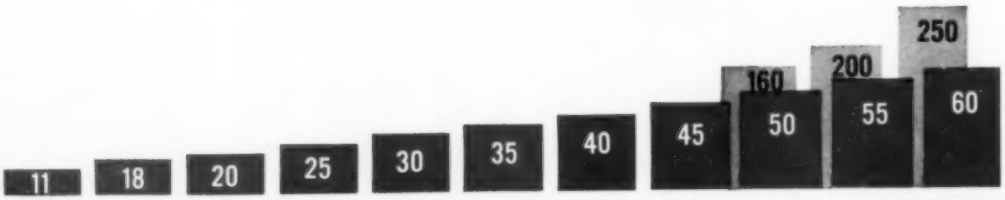
So you can select a C-E Vertical-Unit Boiler with complete assurance that your installation will not only reflect Combustion's long experience—more than 20 years—with the basic VU design but will also reflect C-E's comprehensive *current* experience in applying this design for conditions identical to yours.

Additional information on 1951 VU contracts

FUELS AND FIRING—Bituminous coal as supplied from all principal mining areas; also anthracite, lignite, oil, gas, bagasse, bark, wood and various refuse fuels. All present-day methods of firing and types of firing equipment are represented including combination firing of two or more fuels.

GEOGRAPHICAL—Units ordered during 1951 will be installed in 27 states, in seven Latin American countries and in Africa, Arabia, Australia, Canada, Israel and Spain.

INDUSTRIES—Automobile, Brewing, Building Materials, Cement, Chemical, Food Products, Government, Institutions, Lumber, Machinery, Metal Mfg., Mining, Paper, Petroleum, Public Utilities, Railroads, Rayon, Rubber, Shipbuilding, Soap, Sugar and miscellaneous manufacturing. B-559



COMBUSTION ENGINEERING

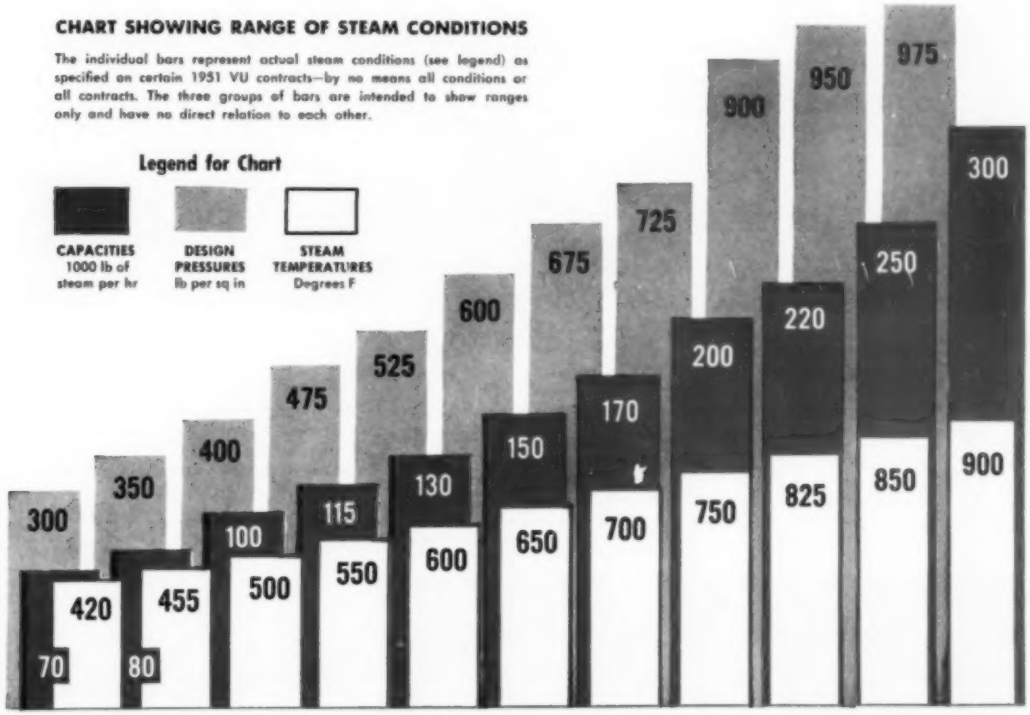
ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS

for 1951

experience in the application of C-E VERTICAL-UNIT BOILERS

CHART SHOWING RANGE OF STEAM CONDITIONS

The individual bars represent actual steam conditions (see legend) as specified on certain 1951 VU contracts—by no means all conditions or all contracts. The three groups of bars are intended to show ranges only and have no direct relation to each other.

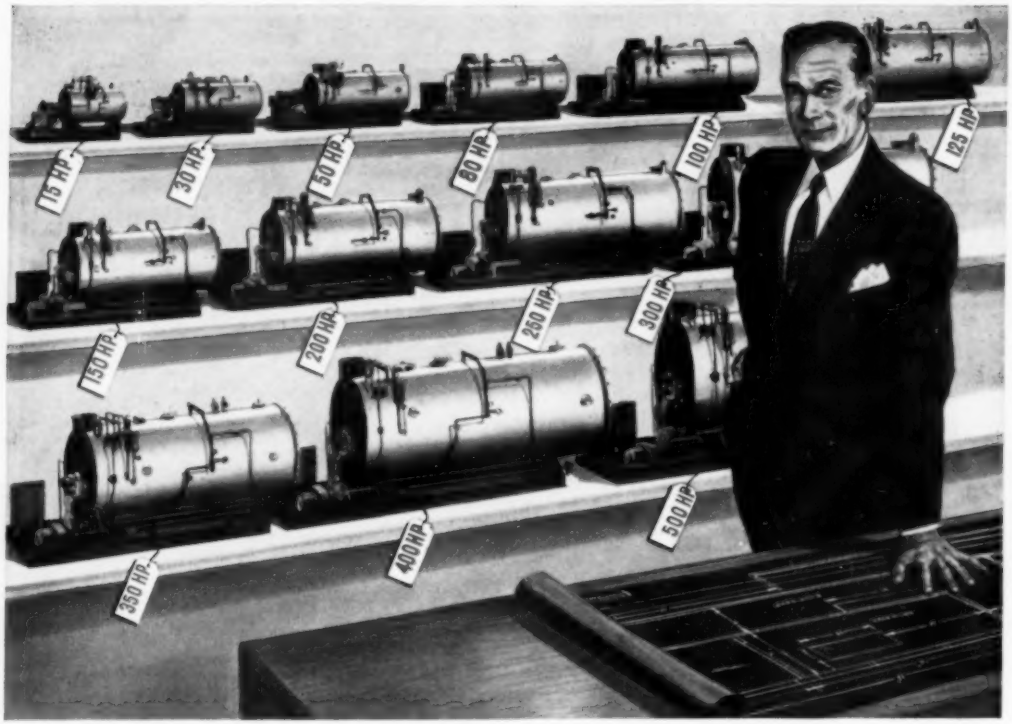


— SUPERHEATER, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

C-E

Selecting The Right Boiler Is Most Important...

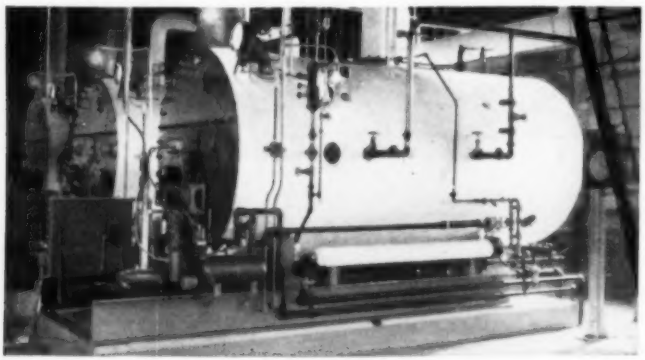


Cleaver-Brooks does not sell steam boilers "off the shelf" even though the boilers are available in standard models. Working with you, your engineers, and your consulting engineers Cleaver-Brooks helps analyze your particular steam needs and loads, both present and future.

These are a few of many factors considered: steam requirements in pounds per hour or b.h.p. — constant or fluctuating loads — fuels available — electric current characteristics — space and boiler room layout — provision for expansion.

Application engineering assistance of this kind assures you a steam plant tailored for your job. Cleaver-Brooks are the first and finest in modern, self-contained steam boilers — operate at a guaranteed efficiency of 80% — burn the fuel most available and economical in your area, gas, oil, or combination gas and oil — fully meet all codes — standard models available in sizes 15 to 500 hp; 15 to 250 p.s.i.

Write for latest, fully illustrated and descriptive Cleaver-Brooks Steam Boiler catalog.



Cleaver-Brooks

STEAM BOILERS

CLEAVER-BROOKS COMPANY

Dept. D, 304 E. Keefe Ave., Milwaukee 12, Wis., U. S. A.
Cable Address: Clebro-Milwaukeewis

Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners

DURASHEATH *goes* ***all*** *the way—underground, overhead, in ducts—without splices*

Splicing cable is time-consuming . . . and costly. What's more it is avoidable. All-purpose Durasheath* can be used for *all* distribution needs up to 5000 volts. It can be run in one continuous length, regardless of location . . . buried underground . . . strung overhead . . . or easily pulled through ducts. No expensive splices are necessary . . . no weak power links . . . no cluttered inventory. One cable—flexible, light Durasheath—goes all the way. You can stock *one* type instead of *three*.

Durasheath handles easily and is used in self-supporting aerial assemblies. Its rugged neoprene jacket resists moisture, chemicals, sunlight, organic decay, corrosion, electrolysis, abrasion, and mechanical injury.

For *reliable* power distribution at *lower* installation cost, insist on versatile Durasheath. See your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. *Trademark

the right cable for the job

ANACONDA® wire and cable

available in all sizes — from large to small — one to three conductors — up to 5000 Volts

for traffic control, airport† power and lighting, mines, industrial plants, railroads, street lighting and many other uses

†when ordered to CAA Specification L-824

Could You Use SAVINGS *Like These?*

40% less
Fuel Consumption
50% more
Boiler Capacity

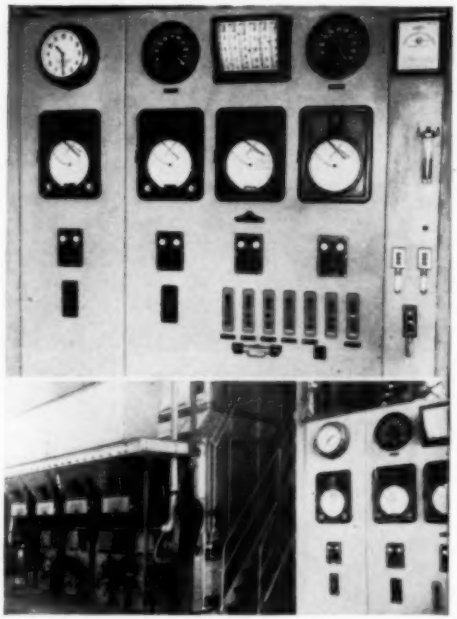
Bailey Meters and Controls Insure Savings at Kerr Bleaching & Finishing Works, Concord, N. C.

The key to complete returns on any investment in new power equipment is a fully co-ordinated system of meters and controls. It's the old story, the tail that wags the dog—careful attention to this comparatively minor part of the over-all installation cost can mean the difference between profit and loss in operation.

Here's where Kerr Bleaching & Finishing Works has cut operating costs—by installing *co-ordinated* Bailey Meters and Controls. The installation includes Bailey Meter Combustion Control, and Bailey Two-element Feed Water Control.

Such a co-ordinated system is an important plus for Bailey customers. Nowhere else can you buy such a complete range of equipment, selected without bias to do the best job for you. Nowhere else can you find such expert engineering service, immediately available through conveniently located direct sales and service representation. May we help you?

Call our local branch office or write for Bulletin 15-H. A-113



Control panel, showing completely co-ordinated Bailey Meters and Controls at Kerr Bleaching and Finishing Works, Concord, N. C.

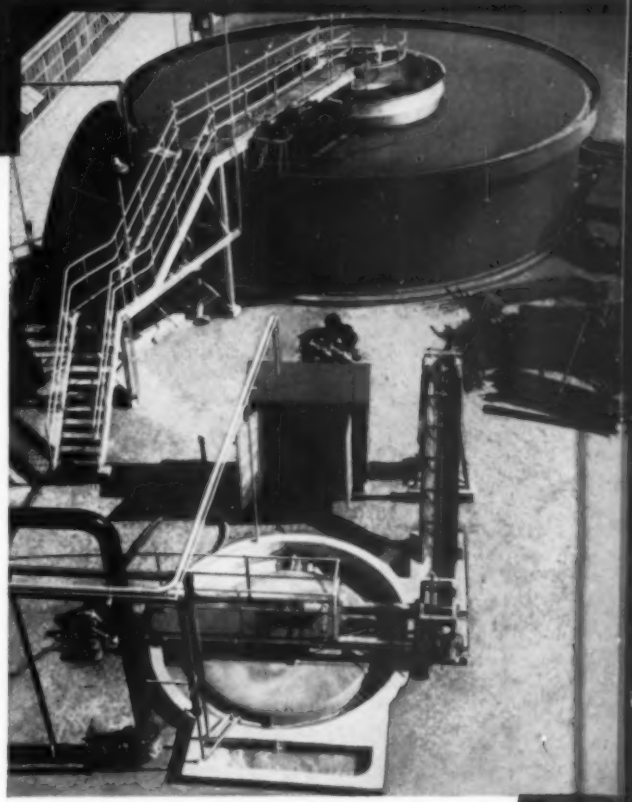
BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

50% SAVINGS IN WATER

thanks to this Gilbert-Engineered waste-treatment system!



Yes, the figures are amazing—but true! A Gilbert-engineered waste-treatment system reduces the monthly water bill of the Norristown Magnesia & Asbestos Company by 50%! *And that's not all.*

This large Pennsylvania paper mill's raw material losses are cut 9%,* its product is improved in quality, plant production is up, and the amount of stream pollution now conforms to state requirements. All this—a *direct* result of a proper waste-treatment system!

Is your plant losing money because of an inefficient or non-existent waste-treatment set-up? It will be worth your while to find out how Gilbert's specialists can help you. Write today—there's no obligation. (P. S.—Gilbert Engineers can help with your air-pollution problems, too!)

FREE—a copy of Gilbert's pamphlet, "Reference Bibliography for Water, Sewage and Power Plant Engineering." It is informative and a handy reference for your library or files. Write: Gilbert Associates, Inc., 412 Washington Street, Reading, Pa.

The Norristown Magnesia & Asbestos Co., Norristown, Pa.—manufacturers of asbestos papers, mill board and felt papers.

GAI
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GILBERT ASSOCIATES, INC.

ENGINEERS • CONSULTANTS • CONSTRUCTORS

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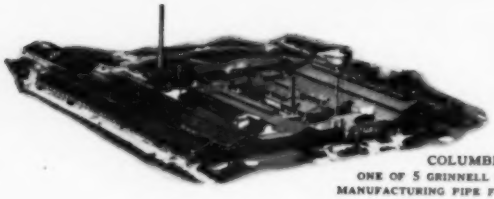
NEW YORK • PHILADELPHIA • WASHINGTON • HOUSTON • ROME • MANILA • MEDELLIN



COLUMBIA, PA.
ONE OF 5 GRINNELL PLANTS
MANUFACTURING PIPE FITTINGS

GRINNELL

complete-line manufacturer of high quality PIPE FITTINGS

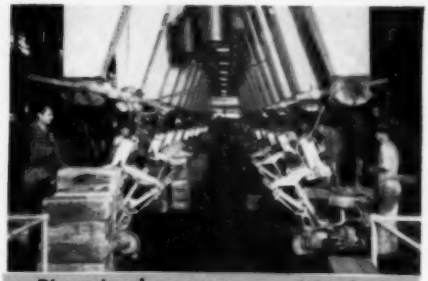
offers you...

- Complete line of high quality malleable iron and cast iron pipe fittings.
- Large stocks of pipe fittings — mass-produced by skilled workers using modern equipment.
- Dependability — the result of finest materials, equipment and methods; assured by rigid production control and triple inspection.
- Coast-to-coast network of branch warehouses and distributors — making available local stocks of Grinnell pipe fittings.

WHENEVER YOU ORDER PIPE FITTINGS,
CALL YOUR NEARBY GRINNELL WAREHOUSE OR DISTRIBUTOR

ONE OF 30 GRINNELL BRANCH WAREHOUSES

GRINNELL
WHENEVER PIPING IS INVOLVED



Dimensional accuracy assured by finest equipment and modern methods of mechanized molding.

Smooth inside finish obtained by the use of the best core sand and the employment of superior core making equipment.

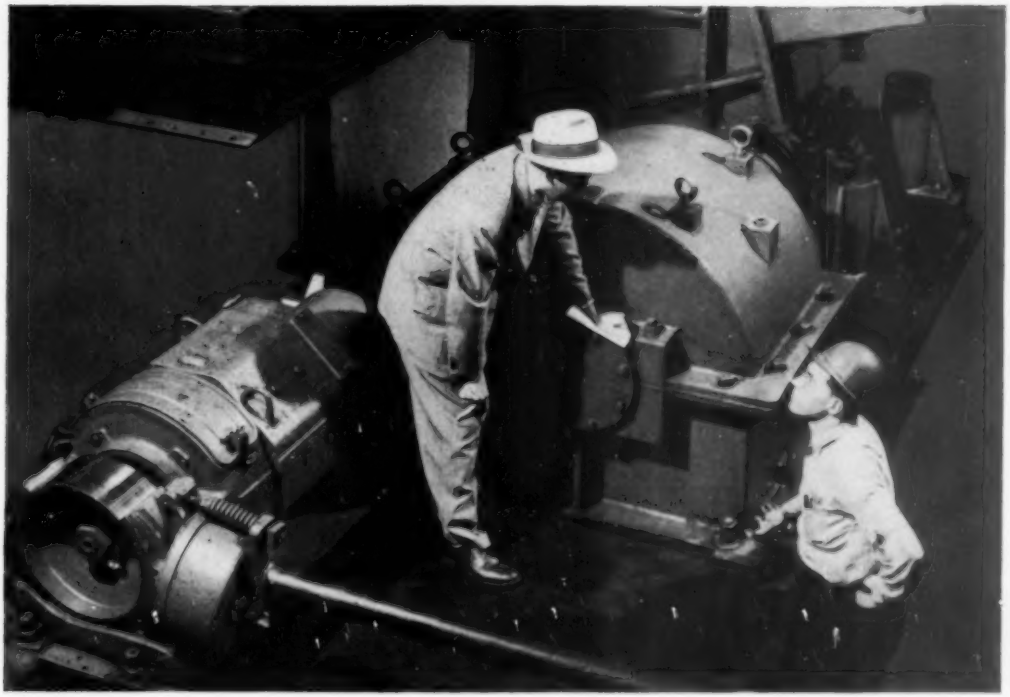
Superior metal, poured into molds on continuous conveyors, gives Grinnell pipe fittings extra strength . . . extra ruggedness.

Accurate chamfer and precision threads, produced by modern tapping machines, provide easy starting and tight joints.

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

PROTECTION PLUS
for gears and drives
—GULF E.P. LUBRICANTS



Gulf E. P. Lubricants are specially compounded to withstand the shock loads and high pressures encountered in the toughest steel mill service. Their extra load-carrying capacity is more than ample to protect any well-designed gear. They prevent excessive wear, keep maintenance costs low.

Gulf E. P. Lubricants are also outstanding in their ability to separate from water—an important consideration in many steel mill gear drives. In a recent investigation of extreme pressure lubricants, all grades of Gulf E. P. Lubricants were found to be definitely superior in this respect. This means that with the proper grades of Gulf E. P. Lubricants and good maintenance practice, lubrication difficulties caused by water can be minimized.

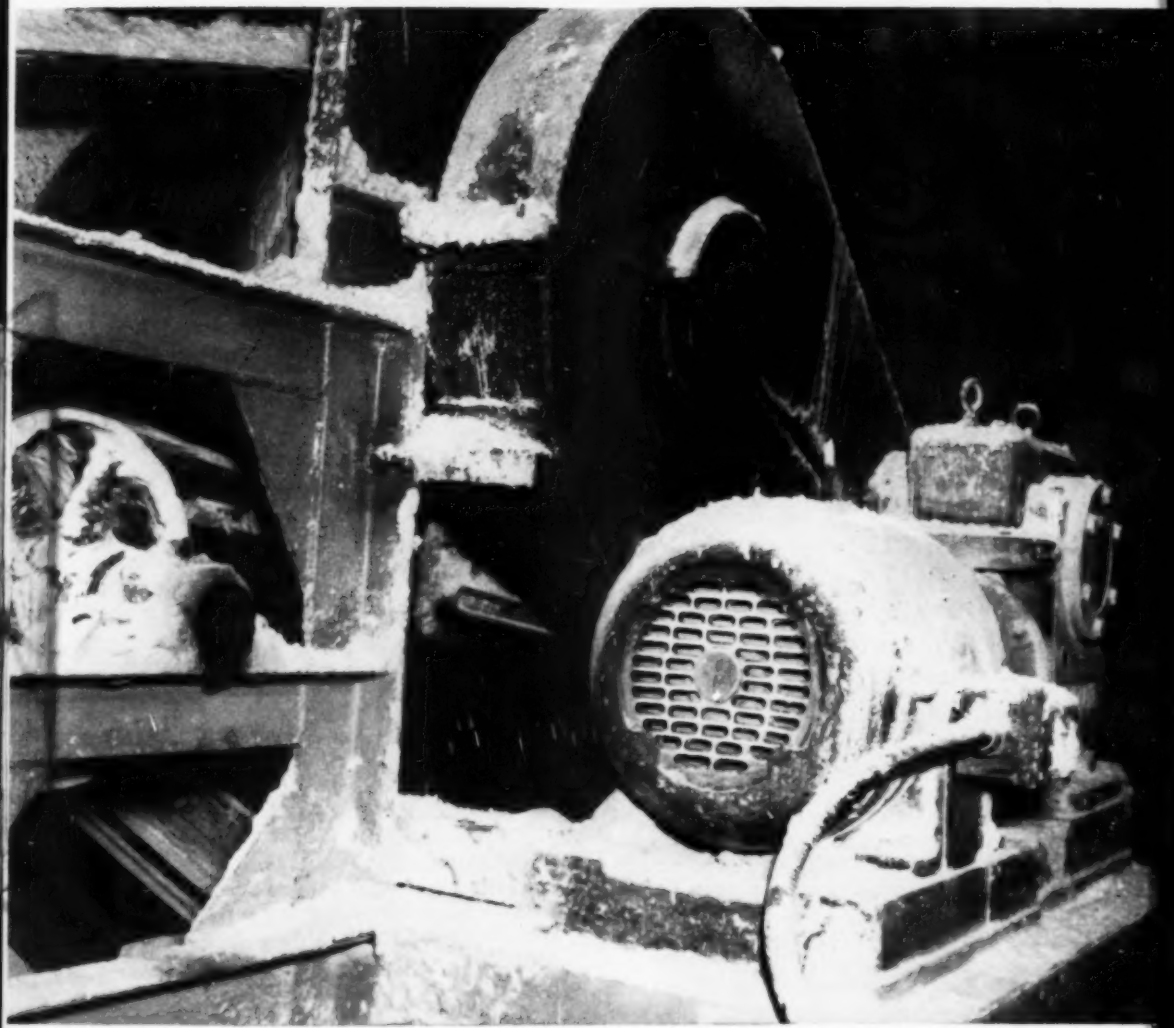
Gulf E. P. Lubricants have other qualities that help insure trouble-free gear drive performance and lower maintenance costs: wide range of viscosities, nonfoaming, tenacious, stable, noncorrosive, rust preventive.

For specific recommendations for your equipment—and for expert help an any problem that involves lubricants or lubrication—call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company
Gulf Building, Pittsburgh 30, Pennsylvania

GULF INDUSTRIAL LUBRICATION

INDUSTRY DOES THE



THE CHEMICAL INDUSTRY depends on standard, "off the shelf," Tri-Clad motors in the most adverse operating conditions, including corrosive, abrasive and explosive atmospheres. The 7½-hp totally-enclosed fan-cooled Tri-Clad motor above drives a crude ash conveyor an average of over 23 hours every day.

GENERAL ELECTRIC

752-12

TOUGH JOBS WITH TRI/CLAD MOTORS

REG. U.S. PAT. OFF.

EXTRA PROTECTION

Every Tri-Clad motor, open or totally-enclosed, is triply-protected against *physical damage, electrical breakdown* and *operating wear and tear.*

That's why you'll find general-purpose Tri-Clad motors in every industry—not only on the usual jobs which they do so economically—but on the *tough* jobs where unfailing performance is a must.

PROMPT DELIVERY

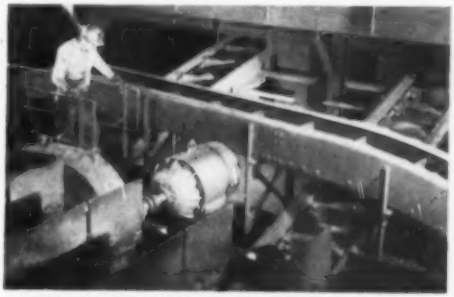
Today especially, delivery and service are important. G-E shipping points all over the country are ready to deliver most standard ratings right out of stock. And with the most complete service shop network in the motor industry you are assured of the best attention to motor problems.

TIMELY INFORMATION AVAILABLE

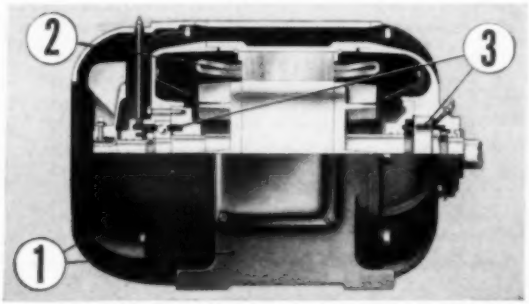
If you are concerned with training manpower, the new G-E Motor Selection and Application Course, including nine strip films, is a unique and valuable aid. A sample copy of the "Instructor's Manual" (GEZ-310), which outlines the course, may be obtained on request.

Also available is a free bulletin on "How to Maintain Motors and Generators" (GET-1202). Contact your local G-E sales office for any of the above material, or write *Section 752-12, General Electric Co., Schenectady 5, N. Y.*

FOOD PLANTS on "continuous process" operation depend on Tri-Clad motors to avoid costly shut-downs. Totally-enclosed, non-ventilated Tri-Clad gear-motor above drives a repulper in a sugar refinery.

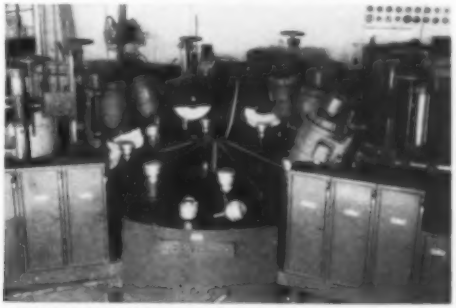


MINING INDUSTRIES know Tri-Clad motors can take abuse, don't twist out of line and are corrosion-resistant. This totally-enclosed, fan-cooled, Tri-Clad motor runs a coal conveyor.

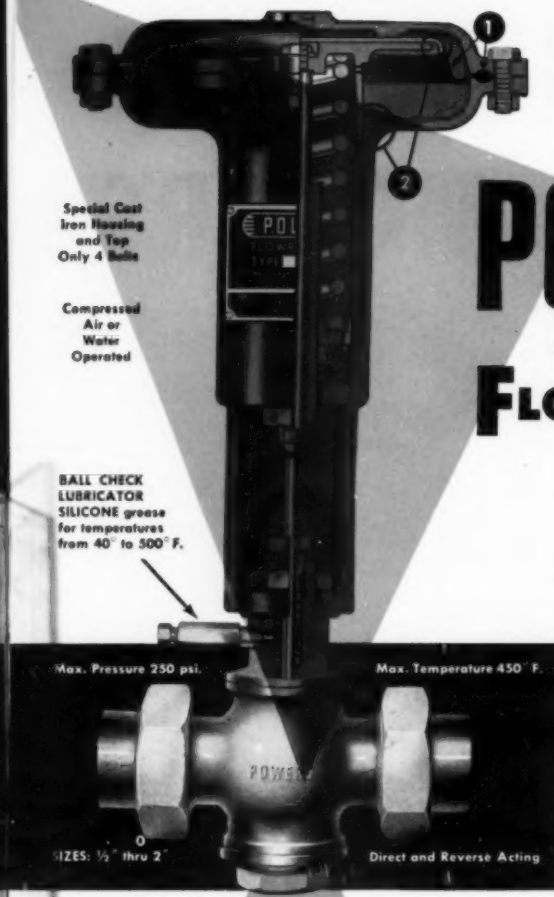


UNINTERRUPTED SERVICE under tough conditions is assured by many outstanding features of Tri-Clad totally-enclosed motors, for example: 1 rigid, cast-iron end shields and frame; 2 Formex* windings which resist oil, heat, shock, moisture, abrasion; 3 *completely* enclosed bearings that will last longer because provision is made for relubrication if necessary.

Reg. trademark of General Electric Co.



METAL WORKING FIELD likes Tri-Clad motors because they're easy to mount in any position, rigid and smooth running, and can be *relubricated if operating conditions warrant — without disassembly!* Six 7½-hp TEFC Tri-Clad motors run machine above which polishes 500 to 1000 metal coffee-makers per hour!

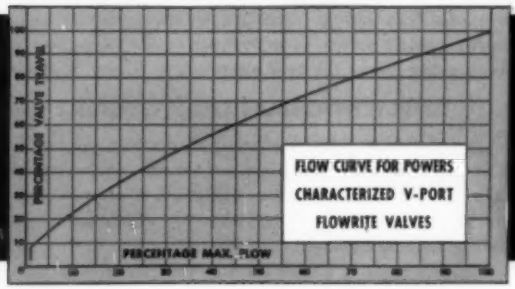

Special Cast Iron Housing and Top Only 4 Bolts
Compressed Air or Water Operated
BALL CHECK LUBRICATOR SILICONE grease for temperatures from 40° to 500° F.
Max. Pressure 250 psi.
Max. Temperature 450° F.
SIZES: ½" thru 2"
Direct and Reverse Acting

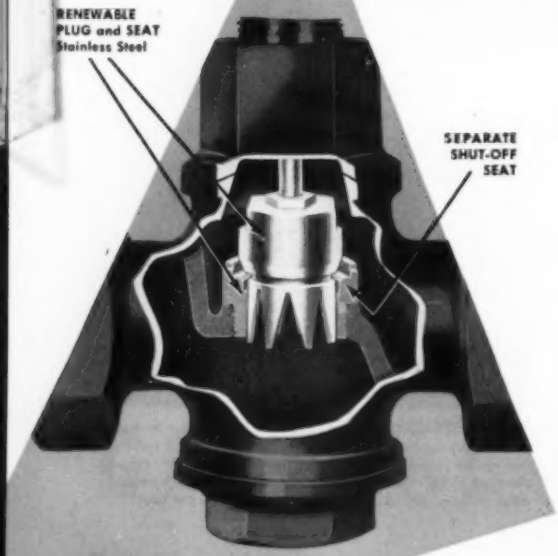
VALVE TOP—Durable moulded neoprene diaphragm (1) has positive sealing bead which provides increased sealing action with increasing control pressure. Efficient diaphragm form insures ample and constant operating power thru full travel. Piston Plate Assembly (2) has a free floating thrust plate which absorbs side thrust. Closely guided piston plate maintains stem in accurate alignment. Maximum air pressure in top, 22 psi.

POWERS® SINGLE SEAT V-PORT *Characterized* FLOWRITE VALVES Give—

Special Flow Characteristics—High lift V-Port plug provides proportional flow throughout entire lift of stem as shown in chart below.

Wide Variety of Valve Sizes—Nine sizes are available, ½" thru 2". The ½" valve can be furnished with plugs to give 15%, 30%, 60% or 100% of maximum capacity. Plugs are easily interchangeable without removing valve from line.





Better Control—Less Maintenance—Superior design of stainless steel plug and seat reduces wire drawing, insures longer life and tight shut off. V-Ports do the throttling, protecting separate shut off seat. Plug and seat are truly removable and can be easily replaced in the field. Inner valves are machined and precision ground and lapped within very close tolerances.

Low Hysteresis—Due to smooth rolling diaphragm and polished stainless steel stem in preformed lubricated packing.

Easy to Adjust—Ball bearing adjusting screw; rust proofed steel calibrated springs with full travel in 5 or 10 psi.

Easy to Install—Powers Flowrite V-Port valves have double unions and bronze body with rugged construction to withstand piping strains.

Easy to Service—Valve and top are easy to take apart and re-assemble, facilitating inspection and maintenance.

Reasonably priced. Contact our nearest office for prices and assistance in selecting proper size valves

THE POWERS REGULATOR CO.

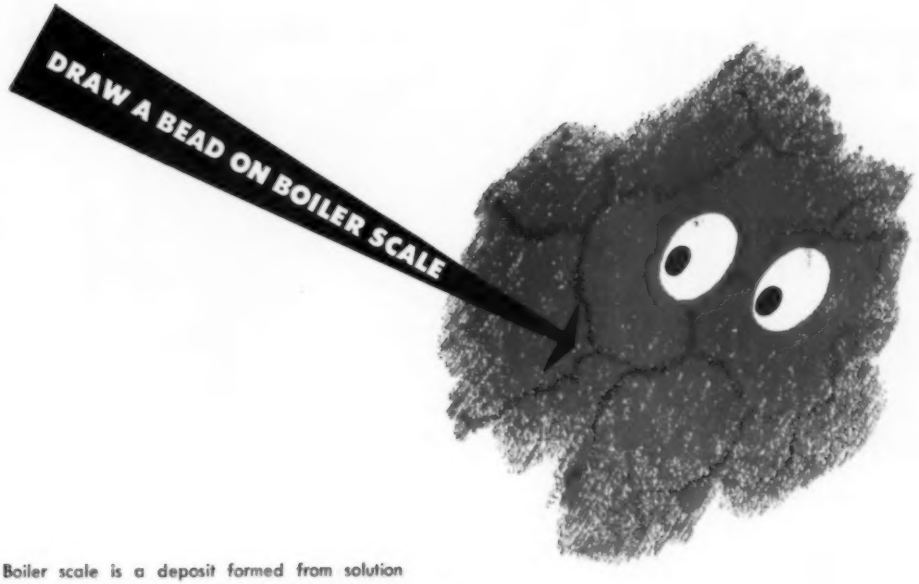
SKOKIE, ILLINOIS • Offices in Over 50 Cities

Chicago 13, Ill., 3819 N. Ashland Ave. • New York 17, N. Y., 231 E. 46th Street
Los Angeles 5, Cal., 1808 West 8th Street • Toronto, Ontario, 195 Spadina Ave.
Mexico, D. F., Apartado 63 Bis. • Honolulu 3, H. I., P. O. 2755—430 Piikoi at Kona

142 Spring St. N.W., Atlanta, Ga.

OVER 60 YEARS OF TEMPERATURE AND HUMIDITY CONTROL

(a70)



Boiler scale is a deposit formed from solution directly in place upon a confining surface. It is crystalline and dense and usually retains its physical shape when removed. (Ref. ASTM D 887, D 933).

Use DREW POWER CHEMICALS

No boiler is exempt from scale under present day operating conditions. Scale results in tube failure, plant shut-down, trouble and inconvenience. It's the duty of every good water treatment company to recognize and solve this problem.

Draw a bead on boiler scale! Call in the Drew Engineer. The water samples and operating data that he obtains in your plant will be thoroughly analyzed in the Drew Laboratories, and you'll be given specific recommendations for corrective or preventive treatment. And you'll receive frequent and continous service, too.

Thorough investigation, proper treatment and frequent service have made Drew one of America's fastest growing water treatment companies. Consult the nearest Drew engineer or write for information.

Power Chemicals Division

E. F. DREW & CO., INC.

15 East 26th Street, New York 10, N. Y.

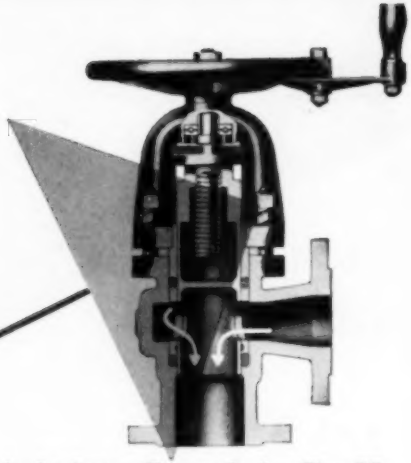
SAN FRANCISCO CHICAGO PHILADELPHIA BOSTON DALLAS

Nationwide Service in Boiler Water and Cooling Water Conditioning

DREW PRODUCTS

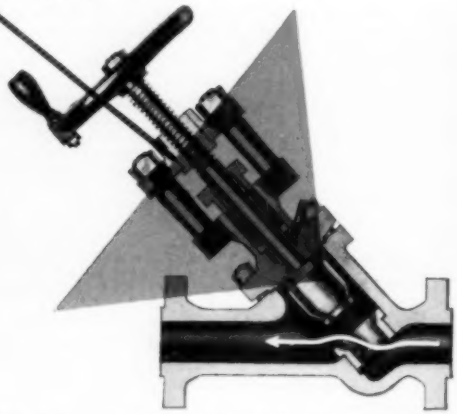
OVER 15,000 BOILER PLANTS USE THESE BLOW-OFF VALVES

MADE FOR EVERY PRESSURE



This is the famous Yarway *Seatless* Blow-Off Valve. Balanced, sliding, nitralloy plunger design eliminates seat—a common source of wear, clogging and leaking. Type B (above) for pressures 50 to 400 psi, angle or straightway, single or tandem. Other types available for higher pressures. Complete description and specifications in Bulletin B-424 for pressures to 400 psi, or Bulletin B-433 for higher pressures.

The Unit Tandem—Yarway's finest blow-off valve for high pressure service. Combines a Hard Seat Valve (for blowing) and a Seatless Valve (for sealing) in a one-piece forged-steel body, flanged or socket welding ends. Also available combining two hard-seat valves. For pressures to 2500 psi. See Bulletin B-433.



This is Yarway's Stellite-Seat Valve for pressures to 2500 psi. Shown here in open position. Disc and seat ring are stellite-faced and carefully mated for tight seating, long life and hard wear. Angle or straightway, single or tandem combinations (hard seat—hard seat or hard seat—seatless) available. Complete specifications and description in Yarway Bulletin B-433.

YARNALL-WARING COMPANY • ***Home Office:*** **116 Mermaid Avenue, Philadelphia 18, Pa.**

Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY **STEAM PLANT EQUIPMENT**

dependable Heat that is economical-efficient-easy to use

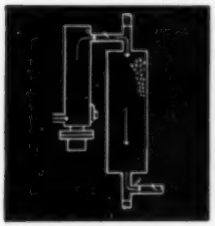
CHROMALOX
ELECTRIC
Circulation Heaters

for heating liquids preheating fuel oils heating compressed air and other gases

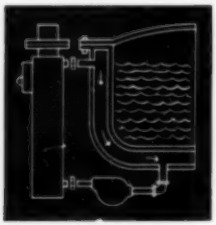
Production costs go down . . . operating efficiency goes up when you install economical CHROMALOX Circulation Heaters. They give you measured quantities of heat, at temperatures up to 750° F. that can be rapidly reached and accurately controlled. Dependable, around-the-clock operation, minimum maintenance.

Uses include: Water heating applications such as steam boilers and accumulators; jacketed chemical kettles, tanks and processing equipment. Preheating fuel oils; heating Dowtherm, Aroclor, Prestone or heat transfer oils. Heating nitrogen, air and other gases, drying steam, plastic powders and other process work.

HERE ARE TWO TYPICAL APPLICATIONS



Heating Nitrogen to Reactivate Alumina



Heating Oil-Jacketed Kettle

check these advantages of CHROMALOX Electric Heaters

1. Efficient heat when and where you need it.
2. Economical initial cost; low installation and operating costs.
3. Accurate temperature control — thermostatically or manually regulated.
4. Wide selection to meet your specific heat requirements.
5. Improved process, production and product with fewer rejects.

for more information *Write for Catalog 50*

It has complete data on many of the 15,000 Chromalox Electric Heaters and Equipment used in modern industry.

EDWIN L. WIEGAND COMPANY
7563 Thomas Boulevard
Pittsburgh 8, Pa.

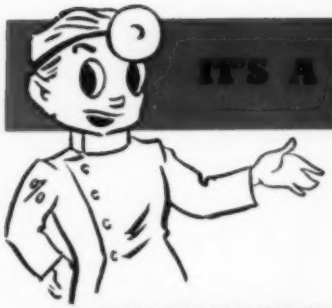
Please send Catalog 50

Name_____
Company_____
Street_____
City_____ Zone_____
State_____

IC-47

CHROMALOX
Electric Heat for Modern Industry

C. B. Rogers, 1000 Peachtree St., N. E., **Atlanta, Ga.**; L. R. Ward Co., 2711 Commerce St., **Dallas 1, Texas**; 932 M & M Bldg., **Houston 2, Texas**; 1511 Louisiana St., **New Orleans 15, La.**; 1519 S. Boston St., **Tulsa 3, Okla.**; W. B. Phillips, P. O. Box 2561, **Raleigh, N. C.**; W. B. Phillips, Jr., 3125 Lamb Ave., **Richmond 22, Va.**



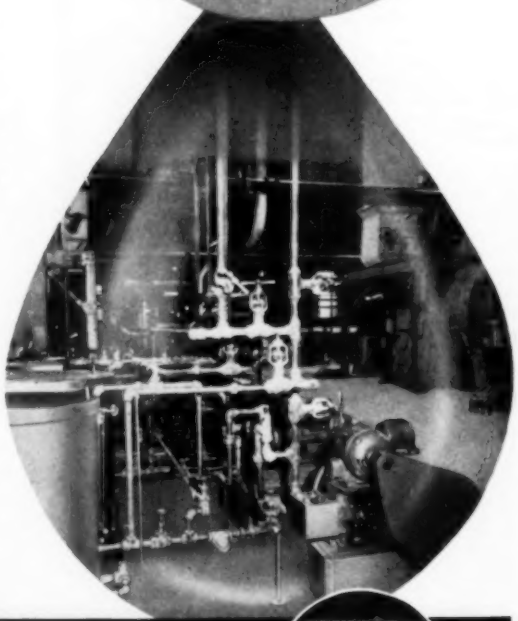
IT'S A *MECHANIZED* OPERATION!

%PROPORTIONEERS%

Boiler Water Conditioning System is Positive Protection for the Boiler

%Proportioneers% installations automatically provide correct boiler water conditions, adding the proper treating chemical in proportion to demand. %Proportioneers% chemical treating systems reduce boiler maintenance, minimize operator responsibility and provide positive control of chemical application. Shown here is a %Proportioneers% installation at the Georgia Power Company's 300,000-kilowatt generating station near Newnan, Ga.

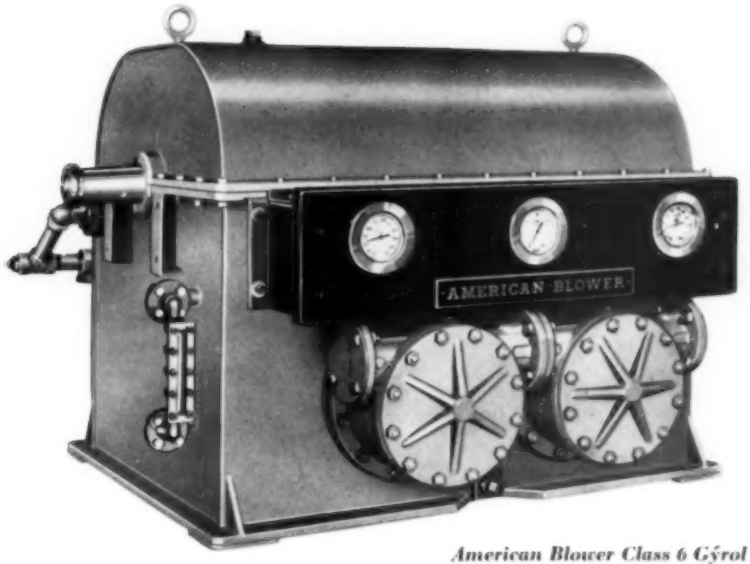
We can supply either *constant rate* or *flow responsive* chemical feeding systems for every type of power plant from the largest high pressure installation to the smallest low pressure job. These systems include metering pumps, control panels, timers, feeding and flushing valves, chemical tanks, dissolvers and auxiliary equipment such as flow meters incidental to automatic control of chemical treatment. Let %Proportioneers, Inc.% assume full responsibility for your complete chemical feeding system. Write for Brochure SM-9020 and Bulletin CAT.



%PROPORTIONEERS, INC.%

Write to %Proportioneers, Inc.%, 393 Harris Avenue, Providence 1, R. I. Technical service representatives in principal cities of the United States, Canada, Mexico and other foreign countries.

American Blower . . . a time-honored name in power plant equipment



American Blower Class 6 Gyrol Fluid Drive

Memo to Power Plant Men —

You can enjoy important power savings, flexible stepless control, reduced maintenance, and get lower pressures at reduced flows for your boiler-feed-pump operation. Install an American Blower Adjustable Speed Gyrol Fluid Drive with a constant speed driving motor.

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary Corporation

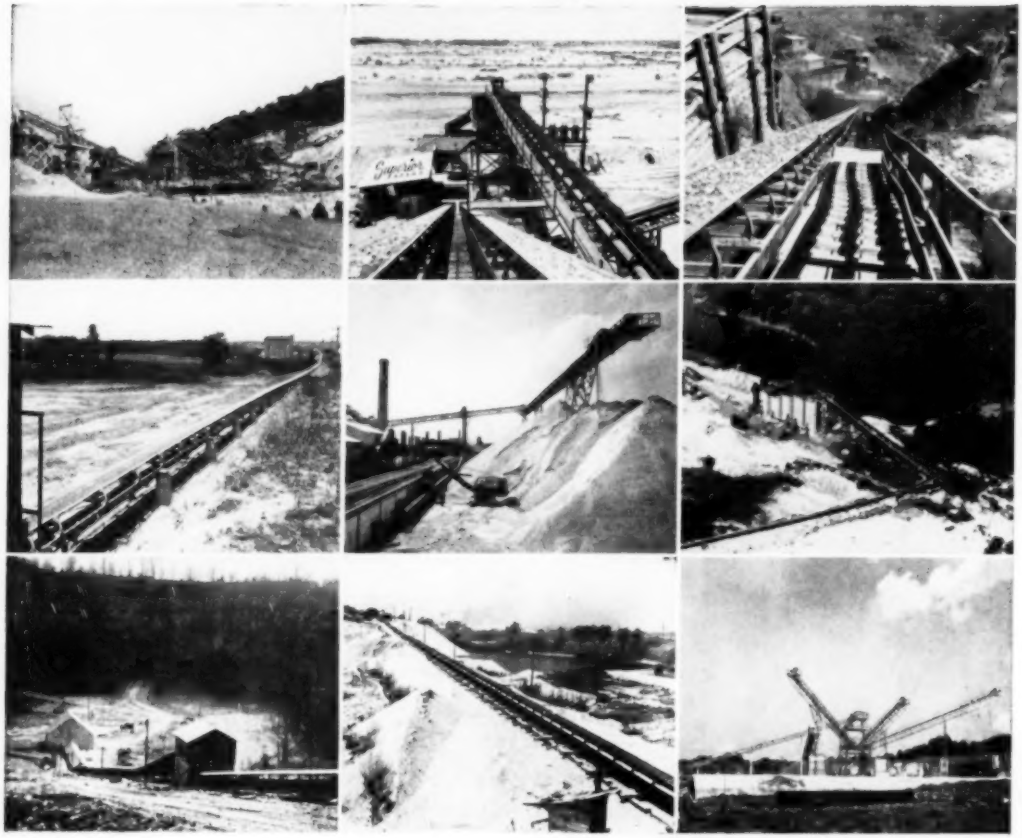
Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • ACME CABINETS • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

STONE HANDLING!

These are tough jobs—requiring sturdy equipment for long life and uninterrupted service.

That's why these operators specified *Continental*



HEAVY DUTY IDLER

STANDARD DUTY IDLER

SELF-ALIGNING TROUGHING IDLER

RUBBER DISC IMPACT IDLER

OTHER PRODUCTS: Elevators, Feeders, Screw Conveyors, Pulleys, Trippers, Buckets, Sprockets, Takeups and Bearings.

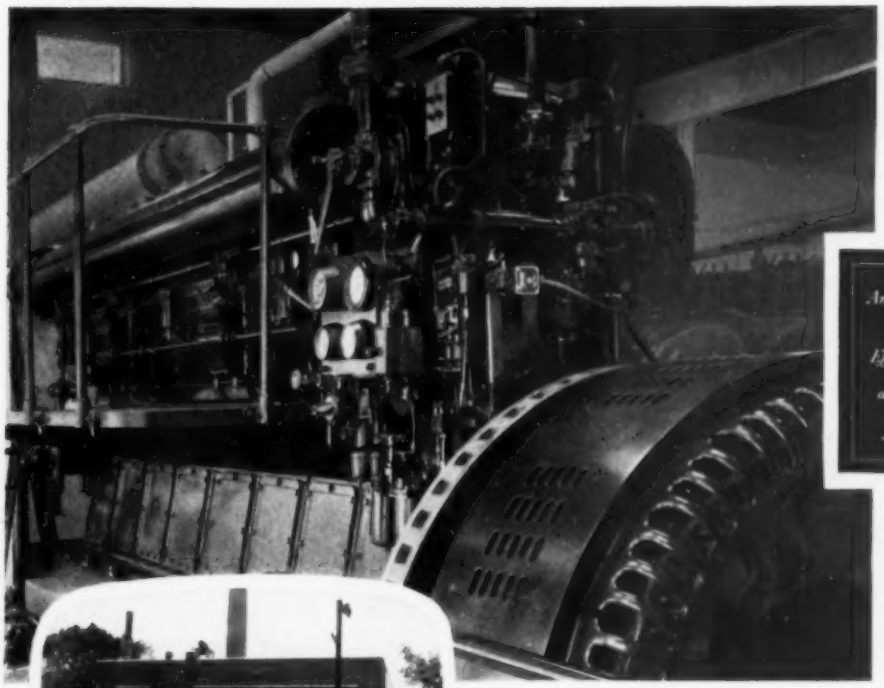
CG-5903

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS



Another Example of Efficient Power at Lower Cost

Tecumseh Electric Plant, Tecumseh, Nebraska, where latest addition is the efficient Cooper-Bessemer gas-diesel shown above.

Why Tecumseh's Cooper-Bessemer Gas-Diesel gets no rest . . .

FOLLOWING conversion from steam to diesel back in 1925, Tecumseh's electric plant has been adding new diesels as load demands grew. Latest is the 8-cylinder Cooper-Bessemer supercharged JS gas-diesel shown here . . . added in 1950.

This engine is kept in virtually continuous operation for 2 simple reasons. First, it has demonstrated the dependability and need for only minimum down time that makes it the logical engine with which to meet base power demands. Second, it's the economical thing to do! Month in, month out, the operating cost has been surprisingly low . . . as low as 3.3 mills per kwh. In plant after plant, Cooper-Bessemer gas engines, diesels and gas-diesels are showing exceptional records of dependability and economy. The nearest Cooper-Bessemer office will be glad to give you interesting facts on actual operation under conditions similar to yours.

The **Cooper-Bessemer** *Corporation*

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York City Washington, D. C. Bradford, Pa. Parkersburg, W. Va.
San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas
Seattle, Wash. Shreveport, La. St. Louis, Mo. Los Angeles, Calif.
Caracas, Venezuela Gloucester, Mass. Tulsa, Okla. New Orleans, La.

Be sure you pick the right tubing

● The faster you run your equipment, the more expensive is every hour of down time.

But today's conditions are demanding full speed, continuous operation and coupled with high pressures, high temperatures and severe corrosive conditions are bound to take their toll of pipe and tubing. There's one practical way to cut loss of production to a minimum: be sure you are using the best and most economical tubing for the job.

It pays to get expert advice on every tubing problem. That's why we remind you that National Tube is the world's largest and most experienced manufacturer of steel tubular products. We can give you highly specialized advice on the selection of alloy steel tubing analyses for your particular job.

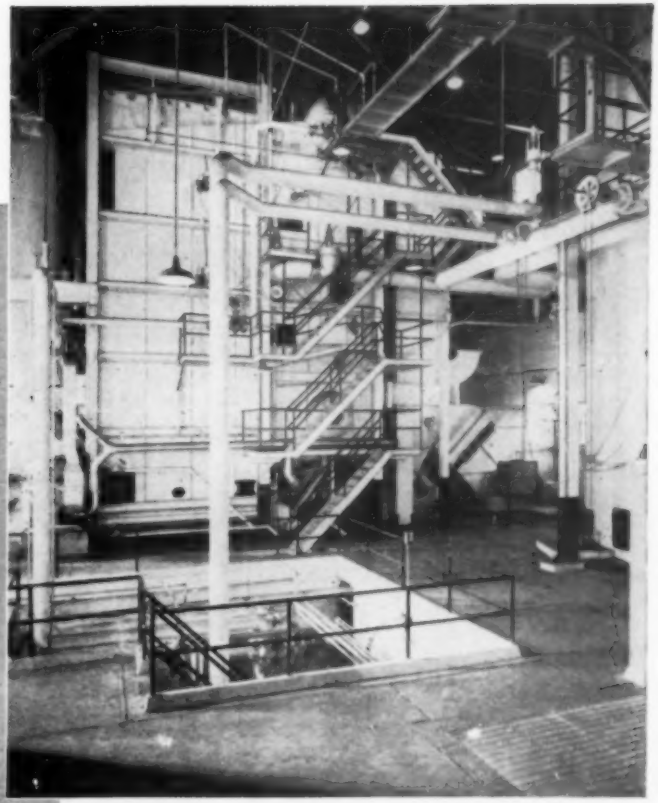
This applies whether you're rehabilitating present equipment or expanding your facilities. Bring your problem to "Tubing Headquarters."

Write today, if you'd like further information.

NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL *Seamless* ALLOY TUBES

UNITED STATES STEEL



USER*
Sugar Refinery
BOILERS
2 Erie City 2-drum
CAPACITY
150,000 lbs./hr.
DESIGN PRESSURE
450 lbs.
OPERATING PRESSURE
410 lbs.
STEAM TEMPERATURE
570°F
TEMPERATURE OF FEED-WATER
250°F
SUPERHEATERS
Erie City
AIR HEATERS
Erie City
FIRING
Traveling Grate Spreaders
FUEL
Lignite 9000 B.t.u./lb. and Bituminous 11,500 B.t.u./lb.

* Name on request

Sweet Words From Sugar Specialists

Recently an official of this large sugar refinery wrote us:

"We are all very proud of this installation and know that our boilers will meet the high standard of efficiency set by Erie City Boilers. Your personnel should be complimented for the fine workmanship that went into these boilers and the efficient manner in which our order was handled and scheduled through your shop.—This indicates good teamwork in your organization."

Yes, it takes good teamwork by all parties concerned to build good boilers, so whatever your steam requirement consult Erie City, for you can depend on Erie City steam generating equipment.

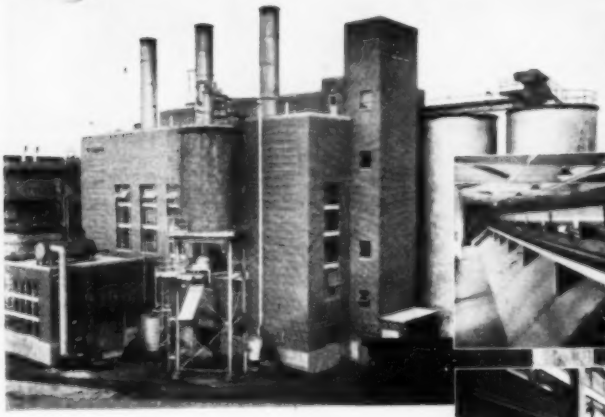
ERIE CITY
112 Years in Steam Generation

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

"$52,000 A YEAR—THAT'S WHAT JEFFREY SAVES BY BURNING COAL THE MODERN WAY!

AUTOMATIC, DUSTLESS COAL HANDLING SAVES US $9,980 IN LABOR ALONE," says H. W. deBruin, Vice President in Charge of Manufacture, The Jeffrey Manufacturing Company, Columbus, Ohio



This modern plant supplies steam to Jeffrey's 48-acre tract of buildings and operations. The new boilers have bettered their expected thermal efficiency of 78%. Compared to the old boiler plant, Jeffrey now gets 20% more steam using the same amount of fuel.

The enclosed screw conveyor, shown at the left, delivers coal to the bunker over the firing aisle. *The entire coal handling system is controlled by one man.* Compared to the old method, Jeffrey saves $6,080 annually in car-unloading costs alone. Ash removal is completely automatic and dustless, too—saves another $3,900.

The plant's firing aisle—showing the two-ton traveling weigh larry that delivers coal to the boilers. Steam generating costs, not including depreciation, are—**old plant, $.598 per thousand lbs. . . . new plant, $.455 per thousand lbs. Total savings, including savings in coal handling . . . exactly $52,904 annually!**

● Handle coal efficiently, fire it properly, and you can save *big* money! Today, modern coal handling and combustion equipment add greatly to *bituminous* coal's inherent economy. You can now get anywhere from 10% to 40% more power from each ton of coal than was possible a few years ago.

If you are planning to modernize your present installation, or if you're building a new steam-generating plant, call in a competent consulting engineer. He'll show you how it will pay you well to burn coal in a modern installation designed to meet your specific needs.

And with coal you get a future dependability no other fuel can offer. Of all America's fuel reserves, 92% is coal. And to supply this coal, America has the world's most productive coal industry. For economy, for dependability, both now and in the future, you can count on coal!

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
WASHINGTON, D. C.

If you operate a steam plant, you can't afford to ignore these few down-to-earth facts!

COAL in most places is today's lowest-priced fuel.

COAL resources in America are adequate for all needs—for hundreds of years to come.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

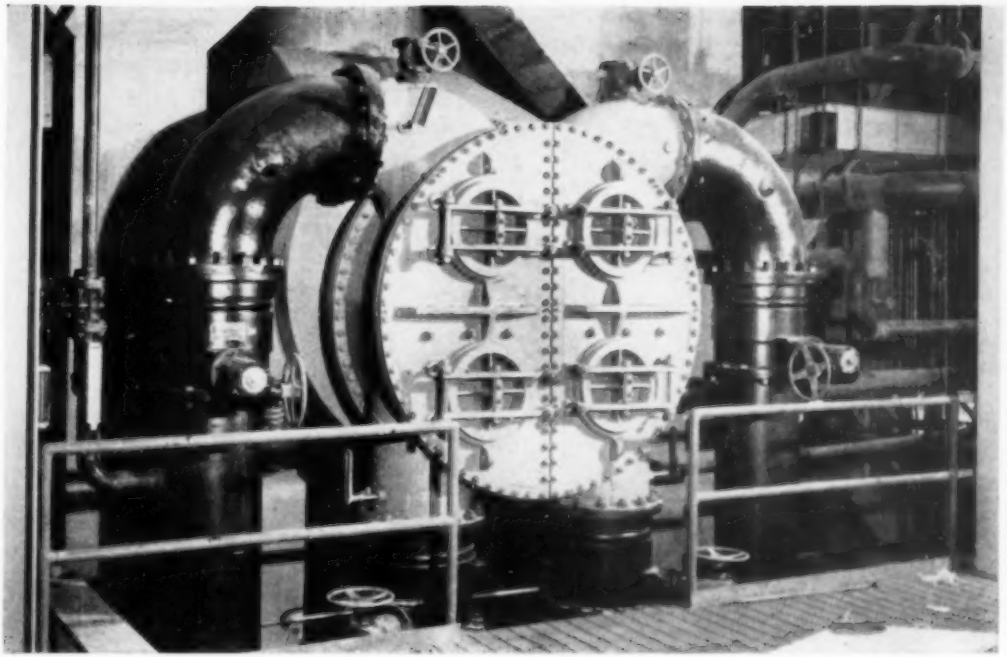
COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

FOR HIGH EFFICIENCY ● *FOR LOW COST*

YOU CAN COUNT ON COAL!



CONSECO 2-PASS CONDENSER

helps turn out low-cost power at Henderson, Kentucky Plant

Pictured above is the Conseco 6000 sq. ft. 2-pass, divided-flow condenser installed in the Municipal Power Plant of Henderson, Kentucky.

This Conseco unit handles a 5000 kw. turbine. Also installed in this modern municipal plant is a Conseco twin-element, two-stage air ejector & a single element, non-condensing hogging ejector.

WRITE for latest engineering bulletins on Conseco Condensers, Ejectors and other power plant equipment. They point the way to smoother plant operation and lower power cost.

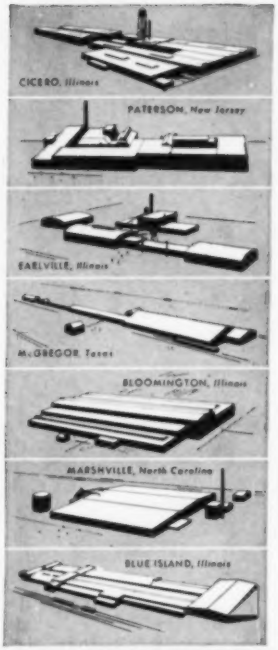
CONSECO

PRODUCTS
include:

BOILERS
•
EVAPORATORS
•
CONDENSERS
•
REFINER FILTERS
•
STEAM JET AIR EJECTORS

CONSECO

CONDENSER SERVICE & ENGINEERING CO.
HOBOKEN, NEW JERSEY



***7** plants serve many industries' needs for . . .*

- **INSULATIONS** for industrial, commercial and railroad use
- **ASBESTOS PACKINGS** and **GASKETS**
- **ASBESTOS TEXTILES**
- **STEEL FABRICATIONS** and Hot-Dip Galvanizing
- **REFRIGERATION SPECIALTIES** for auto trucks, trailers and railroad equipment
- **RAILROAD EQUIPMENT SPECIALTIES**

UNIBESTOS FOR TEMPERATURES UP TO 1200° F.
UNIBESTOS BLOCK
METAL-FACED INSULATING BLANKETS
AMOCEL FOR TEMPERATURES UP TO 600° F.
TAILORED-TO-FIT INSULATIONS
ASBESTOS TEXTILES AND PACKINGS

UNARCO INSULATIONS ARE FAMOUS FOR

High Thermal Efficiency Plus . . .

Insulations are used for only one reason—to save money! And No. 1 on the list of requisites is high efficiency *year-after-year*. Unarco insulations are famous for this long service. Unibestos and Amocel, for example, resist all normal hazards; may be removed and re-used repeatedly without damage or loss of efficiency. In all Unarco insulations you get over 34 years of problem-solving experience for the *utmost* in user—economy.

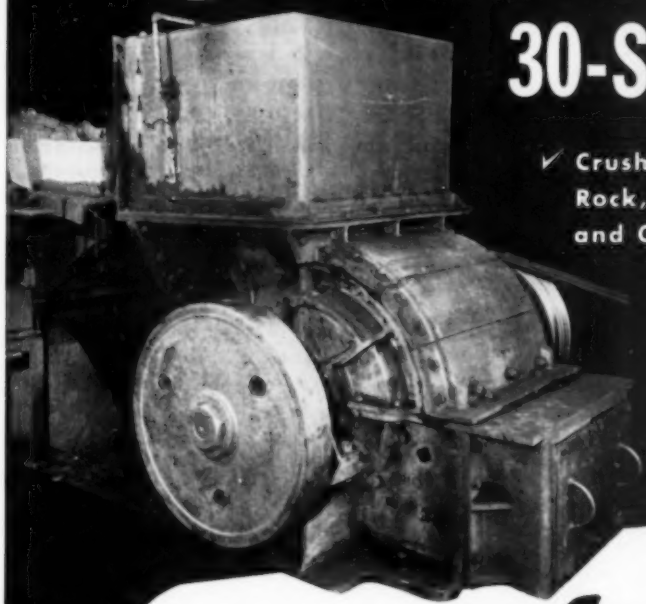
For further information write or call
333 Candler Building, Atlanta, Ga., Telephone, Lamar 7113.

UNARCO

UNION ASBESTOS & RUBBER COMPANY

DEPT. F-4, 332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

NEW *American* HEAVY-DUTY 30-S CRUSHER



- ✓ Crushes ROM Coal Rock, Slate, Sulphur Balls, and Gob . . . *without oversize*
- ✓ Saves Labor Costs of Pickers
- ✓ Saves Coal

THE HEAVY-DUTY *American* PAYS OFF FOR THESE 3 MINES:

- **CRESCENT COAL CO., Central City, Ky.** "We have not spent a cent on this crusher since installation," writes the General Manager. It has eliminated two pickers . . . recovers coal previously thrown away on account of impurities. By crushing and washing, this coal is salvaged. Estimated average of 280 tons of coal and "gob" go through crusher every day. "In 18 years' experience with American Crushers, we know it is the most economical and ideal crusher for our operation."
- **PERRY COAL CO., O'Fallon, Ill.** Previous crusher required three men at the picking table, according to the Mine Superintendent. Today, only one operator is needed to remove wood and tramp metal. No replacement parts have been needed . . . recent inspection showed no signs of wear after 16 months' operation at a daily operation of 210 tons for 7" plus ROM coal. This Heavy-Duty American is one of five Americans installed at this mine.
- **SOUTHWESTERN ILLINOIS COAL CO., Percy, Ill.** "The Mine reports that the installation of the American Pulverizer #30-S crusher has been an excellent labor-saving device. In the 12 months of operation the crusher has had no parts replacements. Continued inspection and past American Crusher history indicate the maintenance of this crusher will be a very small item. Approximately 320 tons of coal per day go through this crusher."

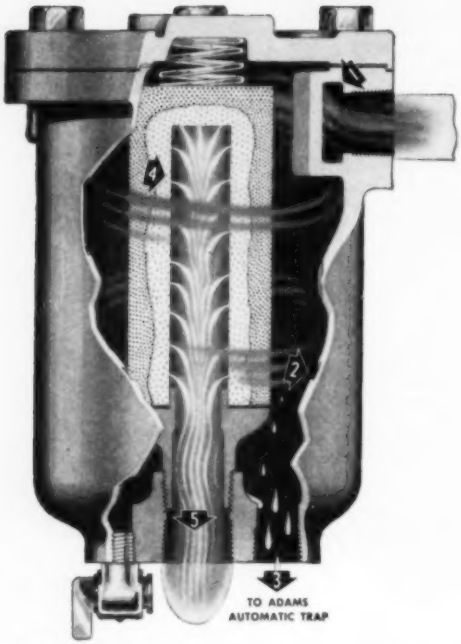
● Let American show you how you can profit by a 30-S Heavy-Duty installation. We welcome your inquiries.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1243 Macklind Ave.
St. Louis 10, Mo.

ADAMS *has both* *



—— BOTH ANSWERS TO THE PROBLEM OF KEEPING WATER, WATER VAPOR, OIL AND DIRT OUT OF COMPRESSED AIR LINES

There's no *one* answer to this problem! The most expensive aftercooler you can buy will not remove scale that is picked up in the distribution lines. The most expensive air filter you can buy cannot guarantee removal of water vapor until it has been condensed by cooling. That's why Adams makes both.

* PORO-STONE *AIR FILTER*

1. Centrifugal separation of dirt and liquids.
2. Drainage to trap directed by vertical cast-in slots.
3. Continuous, fully automatic trap action.
4. Rapid diffusion and filtration through permanent, cleanable Poro-Stone.
5. Clean, dry air at practically unchanged pressure. Standard, stocked sizes handle from 10 to 700 cfm.

Easily installed in either vertical or horizontal pipe line.

* *AFTERCOOLER AND CYCLONE SEPARATOR*

Cools air to within a few degrees of cooling water, making certain that compressed air is colder than surrounding atmosphere, so that no further condensation can take place.

Counter flow, air-through-tube design assures continuously high heat transfer rate.

Double cyclonic action deposits all water and entrained oil in moisture chamber.

R. P. ADAMS CO., INC.
247 E. Park Drive, Buffalo 17, New York

Please send me your latest literature, Bulletin No. 176 on BOTH the Poro-Stone air filter and the Adams Aftercooler — Cyclone Separator.

Name .....

Company ..... *Title* .....

Address .....

City ..... *State* .....

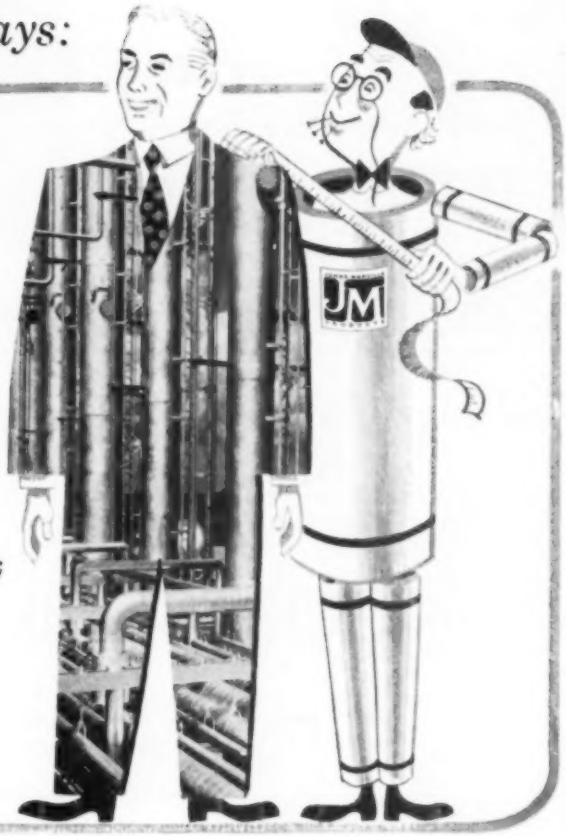
FOR YOUR PROFIT'S SAKE — FIND OUT ABOUT BOTH

R. P. ADAMS CO., INC., BUFFALO 17, N. Y.

Mr. Insulation says:

"Buying insulation is like buying a suit of clothes:

—the better the materials; the more expert the tailoring, the better your investment"



Just as no one cloth can be used for every suit of clothes, there is no one raw material that can serve as the ideal insulator for every industrial insulation job.

For this reason, Johns-Manville manufactures a wide variety of industrial insulations—of asbestos and other raw materials—each of which is designed for a special purpose. These insulations span the entire range of temperatures from 400 F below zero to 3000 F above.

But, again, there is much more to the story of insulations than their manufacture. In order to get the greatest return from your investment in them, they must be expertly engineered to the job, and then skillfully applied.

Johns-Manville makes available to you the service of experienced insulation engineers, and highly skilled mechanics for the proper application of Johns-Manville insulations.

If you are contemplating an insulation installation for your plant, it will pay you to look into this Johns-Manville insulation service. For further information just write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville *first in* **INSULATIONS**

1. water level only
   or
2. water level *plus* steam flow
   or
3. water level *plus* steam flow *plus* feed water flow

No matter how many control influences you prefer on your Boiler Feed Water Regulators . . .

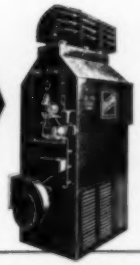
COPES will give you correct feed and close level control—without depending on any other instruments.

NORTHERN EQUIPMENT DIVISION • ERIE, PA.
CONTINENTAL FOUNDRY & MACHINE COMPANY

COPES

BOILER FEED WATER REGULATION

HERE ARE *5 ways* →



A DRAVO *Counterflo* HEATER* CAN WORK FOR YOU!

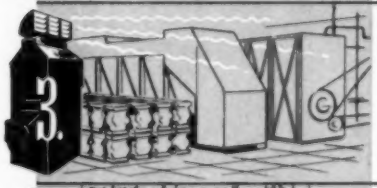
*DIRECT-FIRED

COMFORT HEATING *(commercial and industrial)*

Dravo Heaters have a 150-foot air throw and recirculate warm air at the working level, giving maximum comfort with minimum roof heat loss. No expensive pipe covering, radiators or ducts required. Quick warm-up; automatic on-off or modulating controls.

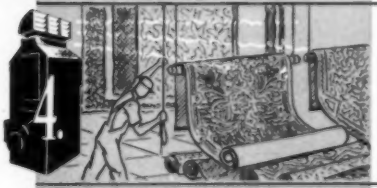
TEMPERING MAKE-UP AIR

Where dust-filled or fume-filled air must be removed from a building by exhausters, this air can be replaced and tempered by Dravo Heaters. Equal pressure is maintained . . . working conditions are kept comfortable.



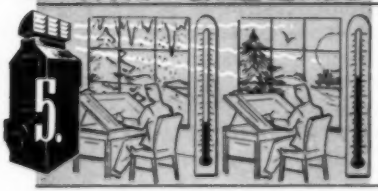
HEAT CURING

Dravo Heaters can be used independently or in combination with other equipment for process curing concrete, plastics, paper, fibre containers, rubber and many other products. Automatic temperature controls keep air flow at desired temperature.



PROCESS DRYING

Moisture content of air can be controlled or removed entirely by using fresh or recirculated air. Immediate response to temperature controller demand makes it ideal for drying paint, farm crops, wood products, rugs (after cleaning) and many other processes.



YEAR-'ROUND VENTILATION

In addition to comfort heating, Dravo Heaters provide fresh-air ventilation in warm weather and can be easily tied in with air-conditioning systems.

DRAVO HEATER *Plus* VALUES . . .

- **Low initial cost . . . users report 30% to 60% savings on installation.**
- **Direct-fired . . . low fuel consumption . . . burn gas or oil . . . readily converted.**
- **Long service life, low maintenance . . . stainless steel combustion chamber eliminates refractory lining.**
- **Easily moved to any location to fit your requirements.**
- **Flexibility . . . can be mounted horizontally or vertically on floor, walls or ceiling.**
- **Available in sizes from 400,000 to 2,000,000 Btu/hr.**

WRITE FOR MORE INFORMATION. It's worth your while to look into Dravo Counterflo Heaters for any of these five functions shown above. You'll be glad you did. Ask for Bulletin No. ST-52 0213.

DRAVO CORPORATION

HEATING DEPARTMENT
Dravo Bldg., Fifth & Liberty Ave.
PITTSBURGH 22, PA.

ATLANTA • BOSTON • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH
Sales Representatives in Principal Cities

Manufactured and sold in Canada by Marine Industries, Ltd., Sorel, Quebec

Export Associates: Lynch, Wilde & Co., Washington 9, D.C.

Safety valves with greater discharge capacity and shorter blowdown are essential on high-pressure, high-temperature steam generating equipment. Consolidated *Maxiflow* Safety Valves release the greatest amount of steam that can flow through a given size inlet with imposed entrance conditions.

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Get complete safety and service feature data; also capacity tables. Write for Consolidated *Maxiflow* Safety Valve Bulletin 707.

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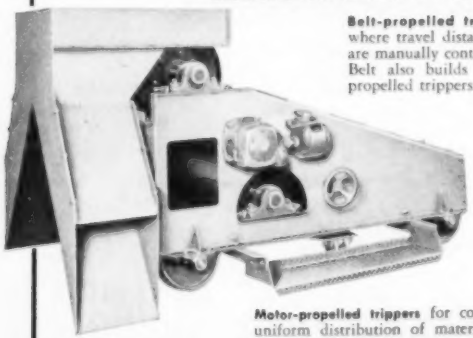
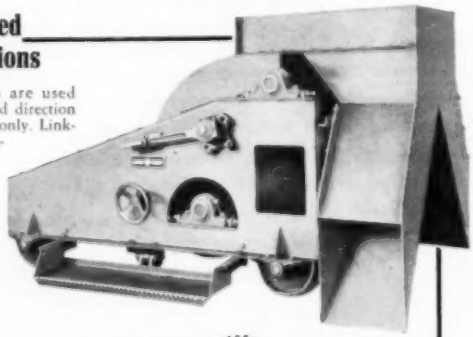
LINK-BELT Trippers offer controlled distribution under all conditions



Belt-propelled trippers are used where travel distance and direction are manually controlled only. Link-Belt also builds winch-propelled trippers.



Motor-propelled trippers for continuous, uniform distribution of material along conveyor or for frequent movement to various fixed discharge locations.

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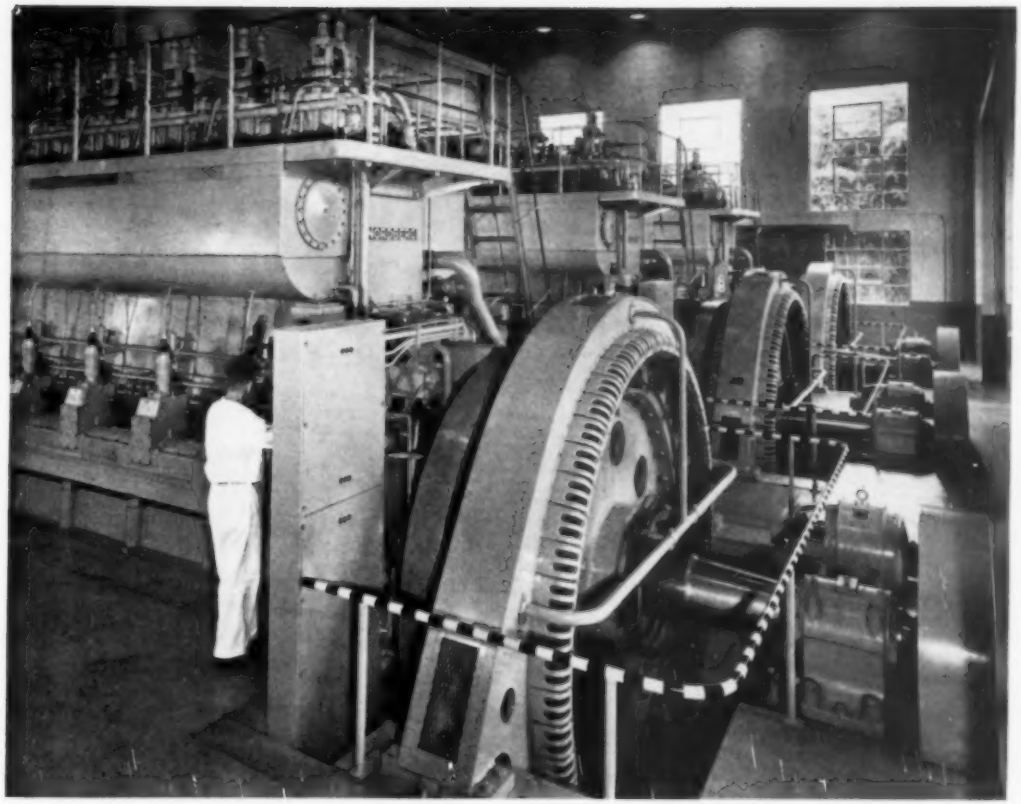

Trends in Design

TODAY'S TREND in machine design is toward higher speeds, increased bearing pressures and totally enclosed mechanisms. Consequently, the selection of lubricants is a tremendously complicated problem.

New machines require lubricants with special properties and extreme pressure characteristics to carry the loads imposed upon them. In many cases additives are required to give increased resistance to oxidation. Detergents, rust inhibitors and foam suppressors are often specified to take care of special conditions. For each task a precise lubricant is necessary.

If there is any question in your mind regarding the proper lubricant for each application, a Standard Oil lubrication engineer will survey your plant and blueprint your requirements. His experience, gained by long contact with the power industry, backed by the world's largest facilities for testing and research of petroleum products, offers you an advantageous method for solving your lubrication problems.

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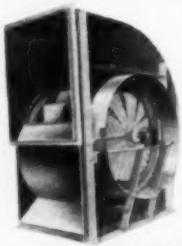

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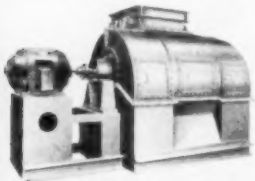

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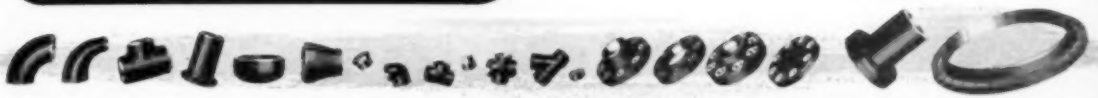

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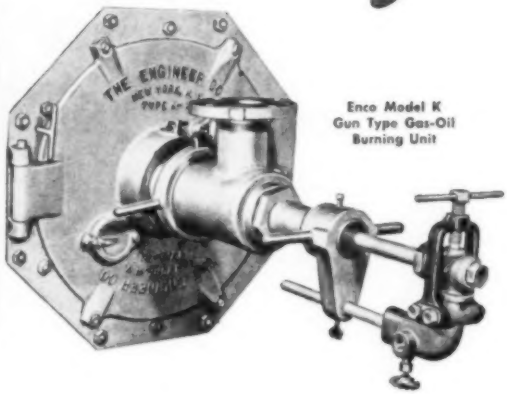

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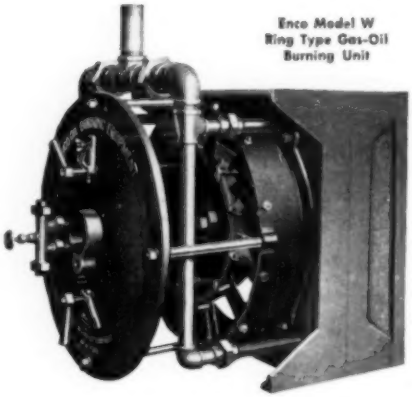

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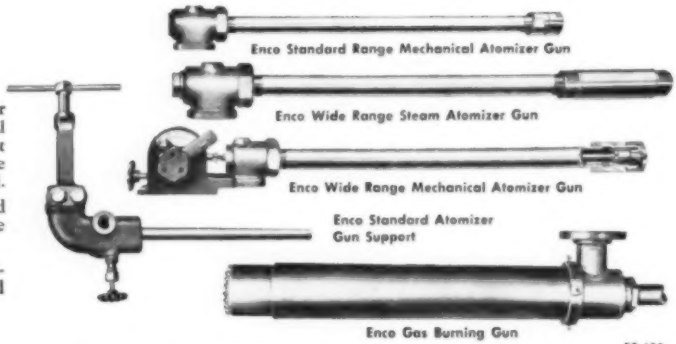

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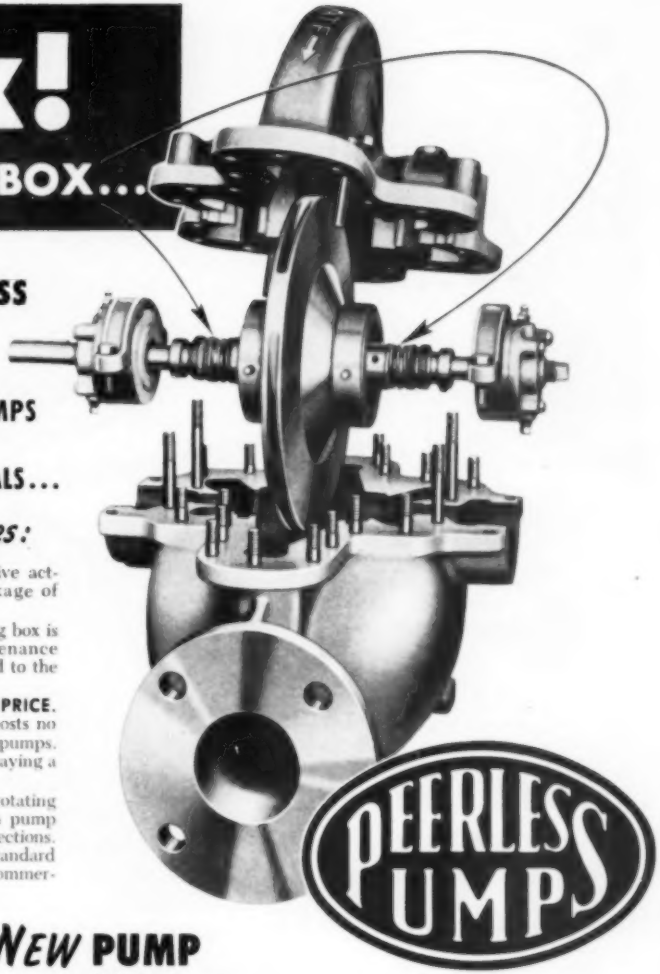


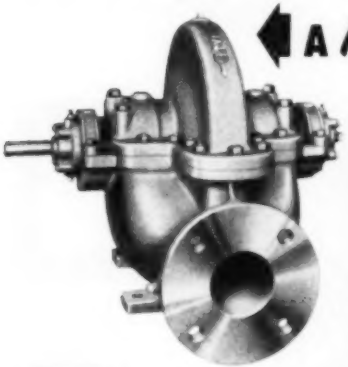
THE NEW PEERLESS TYPE AS

GENERAL PURPOSE PUMPS are designed around MECHANICAL SHAFT SEALS...

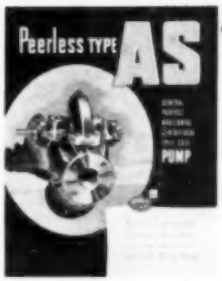
Here are 4 Big Advantages:

1) **NO LEAKAGE.** Simple, positive acting, shaft seals prevent leakage of liquid from pump.
2) **LESS MAINTENANCE.** Stuffing box is completely eliminated; maintenance trouble and expense is reduced to the minimum.
3) **CUSTOM PUMP–STANDARD PRICE.** The Peerless Type AS pump costs no more than ordinary split-case pumps. You get extra quality without paying a premium.
4) **EASILY SERVICED.** Entire rotating element can be removed from pump without disturbing line connections. Shaft seals and bearings are standard items, easily available from commercial sources.

PEERLESS PUMPS



A NEW PUMP
A NEW BULLETIN



Write for Bulletin No. B-1350 which completely describes and illustrates the modern design and construction features of Peerless Type AS pumps.

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

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...as much as 65% to 80%
BY

CHAPMAN

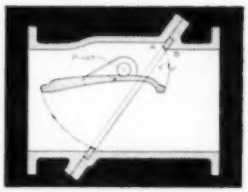
Tilting Disc CHECK VALVES

Typical test on a 22-inch Chapman Tilting Disc Check Valve under 450 pounds gas pressure . . . carrying 3,200,000 feet of gas per hour . . . showed a drop in pressure of less than 7 inches of water.

The average reduction of head loss . . . as against conventional check valves . . . is 65% to 80%.

That's because the balanced hinge-pinned disc, of special aerofoil design, has exceptional lifting qualities, lightness in unbalanced weight, and minimum resistance to flow in open position. And valve body is streamlined, with through-way always equal to the area of the pipe.

This means that *disc won't slam* under usual piping arrangements ...and that it seats drop-tight. It means, too, that many new lines can be designed in smaller size. Send for Catalog No. 30, giving complete data and test-curves on Chapman Tilting Disc Check Valves.



Cross-section of the Chapman Tilting-Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

THE CHAPMAN VALVE MFG. CO.
INDIAN ORCHARD, MASSACHUSETTS

Timely Comments

A Plant Machinist Comments on How to Increase Production

EXPERIENCED COMPUTERS tell us that no computation is any more accurate than its least accurate factor. In problems dealing with labor, the factor *man-hour* is the wobbly one. It may mean the hour of an experienced man, well rested doing his accustomed job under good supervision with a company that provides the best equipment. Conversely, it may mean the hour of an inexperienced man, overtired, working at an unfamiliar job with strange supervision, using the equipment that is left over after the regular gangs are fitted out. This variable must be kept in mind when trying to adjust the labor force for fluctuating loads. If we are to use the first as our standard, we must see that those conditions are met and discard any data that does not fit this pattern.

First, let us see what can be done to **reduce forces** in slack times and still hold the roster intact. If all two-week vacations are confined to a six-month period, that is an 8 per cent reduction in force. In many industries, the summer months are the slack season. In that case, some of the men will voluntarily return to the farm for an extended period if they can do so without prejudice or loss of seniority. Other men will wish to stretch their vacations by taking an extension without pay. These expedients will reduce forces and costs without upsetting the morale of the men.

Forces may be increased somewhat by reversing the above process. The first step to increase forces is to check leaves of absence and vacations. This permits the forming of effective working groups and lessens the load on supervision. The second step is to adjust hours. Working a six day week increases the work force 20 per cent and increases costs per manhour only $8\frac{1}{3}$ per cent. And production rates under these conditions may be expected to remain steady.

On the other hand, if the working force is expanded by temporary hiring or by unwarranted promotions, the production rate will probably fall more than $8\frac{1}{3}$ per cent. One cannot expect the experienced men to produce more than the novice for the same money the novice gets.

The seven day week is a fallacy and a delusion. No man can so regulate his health or his affairs as to work a seven day week.—attendance becomes very spotty and working groups are broken up. Lapping of shifts by working more than eight hours is also uneconomical. It results in either too much machinery when one crew is working or too many men when two crews are working. Of course this statement does not apply to short periods of time needed for receiving assignments and checking tools in and out.

The next way of improving production lies in **improving morale.** If men can be convinced that they will not be laid-off when slack season comes, and that they will not be censured for idleness when taking a breather during slack periods, they will "give" with extra effort to get through the heavy periods. This calls for the "old college try" after all furloughed men are at work and hours have been adjusted.

Random working of overtime without proper organization produces such varied results that it has no place in basic cost estimates. It should only be used in repairing abnormal breakdowns.

The author, *R. W. English*, is a machinist, a union member, and has been employed in industrial occupations for 28 years. He asked the editors to make it clear that these opinions are his own, and he does not knowingly speak for his company, or any other person or organization.

Hays Guide to Boiler Plant Results

increased efficiency

"Operating efficiency has been as high as 82%—much of the credit going to the accuracy of (Hays) automatically controlled combustion."

SHERWIN WILLIAMS, Chicago Plant

low maintenance

"we find that due to the (Hays) properly controlled combustion, our maintenance on both stokers and boilers has been considerably decreased."

AMERICAN TOBACCO COMPANY

fuel savings

"we estimated that . . . we would be able to pay for the new equipment (Hays Combustion Control) out of the fuel savings in three years. Since then, the records show that the amortization of the original investment has been accelerated."

RAYBESTOS-MANHATTAN, INC.

rapid response to wide load swings

"we have made test runs using the Hays system, bringing the load rapidly up from 8,000 to 80,000 lbs per hour with excellent results. Fuel-air ratio was held at the desired value and CO_2 at 15%."

BEMIS BROTHERS BAG CO.

HAYS COMBUSTION CONTROL GETS RESULTS . . . *Proof of this statement is available in the form of case histories on the boiler plant experience of 9 leading companies. These "result stories" cover small, medium, and large boilers—burning all types of fuel, including alternate fuels—with different load characteristics—and different uses for steam.*

Send us a brief statement of your specific conditions and specifications. You'll receive the case histories which fit your needs and a 48 page booklet on "Boiler Plant Instrumentation".

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MICHIGAN CITY 4, INDIANA

Large Power Producer Meets Demands up to 400,000 lb per hour with Evaporation Rate of 12.8

"During the many years we have been generating power at Scovill Manufacturing Company, Waterbury, Conn.," says Leo Niekerk, Power Plant Chief Engineer, "we have evolved a general philosophy for power plant operation: buy the best equipment available, then operate and maintain it in the most intelligent way possible. We have two power houses—the West Power House containing one 500 kw vertical turbine, one 3,000 kw condensing turbine generator, and two 600 hp oil-fired 150 psi boilers on standby; and the East Power House containing three 3500 kw condensing turbines, one 5,000 kw topping turbine, six 600 hp stoker-fired 250 psi boilers and, handling most of the load, two 660 psi oil or pulverized coal-fired steam generating units rated at 225,000 lb/hr and 150,000 lb/hr."

fuel handling

"Coal from railroad cars is transferred to overhead bunkers by a conveyor system. Fly ash from dust collectors is removed by conveyor ash handling system and discharged through an outside silo. Oil is stored in two 150,000 gal. tanks and fed by gravity to the fuel oil pumps in the basement."

combustion control

"When we installed our Boiler #1 in 1940 we selected Hays Combustion Control. We were so pleased with its operation during the next six years that when we installed Boiler #2 in 1946 we again specified Hays Combustion Control. Each boiler has its own Hays panel containing a complete complement of modern boiler room instruments and controls. Currently we are meeting steam demands up to 400,000 lb per hour (with load swings as high as 60,000 to 70,000 lb per hour) while achieving an evaporation rate of 12.8, a fuel cost per kw of $.0049, and a cost per thousand pounds of steam of $.706. No small part of the credit for the versatility and efficiency of our operations should go to the Hays Combustion Control System. Maintenance expense on the control system has been negligible.

The above story is a condensation of a completely illustrated case history on the power plant operation of Scovill Manufacturing Company. Write for Bulletin R-8, available free from The Hays Corporation, Michigan City, Ind.

Industry Speaks

SOUTHERN POWER AND INDUSTRY

Air Conditioning—50th Anniversary

Adapted from comments by *Cloud Wampler*, president of the *Carrier Corporation*, before the annual stockholders' meeting.

AIR CONDITIONING, which is celebrating its fiftieth anniversary this year, achieved the status of a billion dollar industry for the first time in 1951. Mr. Wampler predicted that the next half century will see the industry increase at least five-fold over today's levels to reach a volume of five billion dollars annually.

"From a volume amounting to only a few thousand dollars in 1902, the industry founded and pioneered by Dr. Carrier and his associates has grown to a point where last year expenditures for air conditioning of all types exceeded $1 billion for the first time. And while it is impossible for anyone to do any accurate fifty year forecasting, I feel sure that before the next half century passes air conditioning will be a $5 billion business.

Four Areas of Growth

Analyzing the growth prospects, Mr. Wampler commented in part on the four principal areas, as follows:

"Great and growing demand for air conditioning for **multi-room, multi-story buildings** such as offices, hotels and apartments, is not in the category of tomorrow's prospect but is actually here today. Practically no new buildings of this type are being constructed without complete air conditioning. All evidence is that the competition from these new air conditioned buildings will be such that soon no business structure will be classified as really modern unless it provides air conditioning for its tenants.

The market for complete **home air conditioning** is often held before us as the greatest area for growth. Certainly this has great potentials. But with respect to small homes this market is still some distance in the future. Prices will have to be still further reduced before the potential can be fully realized.

Another large field in which substantial strides have been made but which still holds even larger potentials is the market for **self-contained units** as well as installed systems in stores and shops.

The application of air conditioning for **industrial processes** is a field too seldom recognized by those who study the future of the industry. Yet air conditioning had its start in solving a production problem involving the control of temperature and humidity, and in the ensuing half century it has become an important tool in scores of industries. In some manufacturing processes, air conditioning is an absolute necessity; in others, it helps make goods better, faster and cheaper.

Alert, Intensive Research Needed For More Output per Man Hour

Adapted from comments by *Dr. Howard E. Fritz*, vice president in charge of research of *The B. F. Goodrich Company*, before the Kansas City section of the American Chemical Society.

CONTINUOUS, intensive research by every segment of American industry is the indispensable factor if this nation is to have the economy of ever expanding production and continuous growth vital to our national security. Every individual business, too, must have a research program to survive in our free enterprise system.

"Alert, aggressive research, backed by the necessary dollars and authority needed to succeed in the task, alone can make possible the great increase in output per man hour worked which must come if we are to reach the goals upon which our sights in the United States have been set.

"To accomplish this job, research must of course have a healthy national attitude and atmosphere. It must create increasingly more new and improved machines and equipment and the vast additional horsepower needed for the workman to operate these tools. If we are to withstand the dangers to our national security which it appears we must face for years it is essential that these must be created.

"During the last generation we have witnessed changes affecting our living standards and manner of life greater than in all the preceding years. Accumulation of scientific knowledge down the centuries and its practical application to producing the goods needed and to solve nature's mysteries have enabled the nation to meet the abnormal demands of a great war and continue its progress.

"In this period, through which we are still passing, there have been many moves to bring social or welfare improvements to citizens. We must never forget, however, that the added cost of these can be borne only by higher production on the part of everyone in our society."

The Role of Resec..ch

Dr. Fritz reviewed the tremendous role played by research in creating the American rubber plants which produced more than a million long tons annually when that amount was needed.

"Plants creating American rubbers, based on many scientific studies long before Pearl Harbor enabled us to solve the rubber crisis of World War II and defeat our enemies. They served the nation admirably following the end of hostilities and again solved the new rubber crisis created after the start of the conflict in Korea."

Safety in Materials Handling keynoted Atlantic Steel Company's 1952 safety program. Considerable interest was evidenced in the various techniques used to handle bale ties, fence, nails, barbed wire, bars, other DIXISTEEL products, and sheets and plates, which are distributed through their Warehouse Division.

The man-on-the-job is key to

Effective Safety Program

at Atlantic Steel Company

EIGHTEEN crane operators and material handlers and 29 shipping department and warehouse employees handled the first of twelve 1952 executive safety meeting programs scheduled at the Atlantic Steel Company in Atlanta, Georgia.

Atlantic Steel executives and shop foremen are recognizing that the man-on-the-job is a specialist in his work. He knows the job better than anyone else. He knows his tools, equipment, and the hazards of the activities he and his group must perform.

The man-on-the-job knows his job better than anyone else. He is the man pointing out hazards and recommending preventive safety measures at Atlantic Steel Co.

This year, the company's safety program is in the hands of the man-in-the-shop. *C. J. Vandeventer*, safety director; *Michael F. Wiedl*, safety promotion director; plant superintendents; and the accident prevention committee schedule the monthly meetings and help in the development and staging of the fast moving programs. General foremen and shop or departmental foremen prepare the basic weekly program outlines and the foremen act as moderators.

However, it is the fork truck operators, the helpers, the crane oper-

ators, and the maintenance men who handle the entirely unrehearsed panel discussions. Their object is to spotlight unsafe practices and initiate corrective measures that will remove the hazards.

Safety in Materials Handling

The topic of one of the meetings our editors attended was Safety in Materials Handling with basic program outlines, etc., provided by Superintendent *J. C. Vaughan*. Foreman *Fletcher L. Payne* acted as moderator and Atlantic Steel's fork lift and industrial truck operators and shipping departmental personnel discussed the hazards of their own jobs.

The men emphasized that fork truck operators have to be well qualified. Atlantic Steel is a rather heavy user of industrial trucks—precision equipment that requires careful and constant attention. The men endorsed the advisability of having all operators examined and licensed. Regular traffic rules and courtesies apply to the industrial plant as well as the open highway. Having sufficiently wide, strong and secure bridge plates into highway trucks or freight cars was stressed as a mighty important point.

Crane and hoist operators took over the second phase of the initial safety meeting, with Foreman *T. R. Johnson* acting as moderator. The men pointed out that the helper is responsible for making hitches but the crane operator must know whether it is safe to pick up and move the load. The crane operator has the authority to order making of any type of hitch he believes required in the interest of safety. Proper use and recognition of crane signals is mandatory.

All crane and hoist equipment must be inspected carefully at the beginning of every shift. Chain slings must be checked for bent or nicked links and for any evidence of work hardening. Iron chain especially is liable to fail if work hardening goes too far before the chain is reannealed.

Subsequent Programs

"Safety in Plant Housekeeping" was featured in the February meeting with the program development handled by Superintendent *G. C.*

(Continued on page 64)

This conveyor Merry-go-round was used to emphasize the company's initial safety program theme. Mechanized conveyor system display was supplied by *R. D. Johnson* of *Mathews Conveyor Company's* Atlanta, Georgia office. These are the shipping departmental personnel, who handled the initial phase of the materials handling discussion.

Below—Foreman *T. R. Johnson* acts as moderator for the Overhead Crane panel discussion, the second phase of the materials handling program. Average supervisory attendance at the monthly safety meetings exceeds 150, a credit to an unusual approach to industrial safety meetings.

Improved production techniques with

Projected Light and Shadow

JOHN HYLER *notes unusual measurement and control methods in food processing, woodworking, and metalworking industries.*

THE principle of light and shadow projection is employed in diversified industrial plants to obtain objectives not otherwise readily procurable. Metalworking personnel will think in terms of the optical comparator, which employs a parallel beam of light directed upon a part to be inspected. By means of a projection lens system and an optically flat mirror, a magnified shadow or image of the part is thrown on a receiving screen. A master chart outline and the magnified shadow of the part must coincide if it is to pass inspection. Inaccuracies may be readily measured.

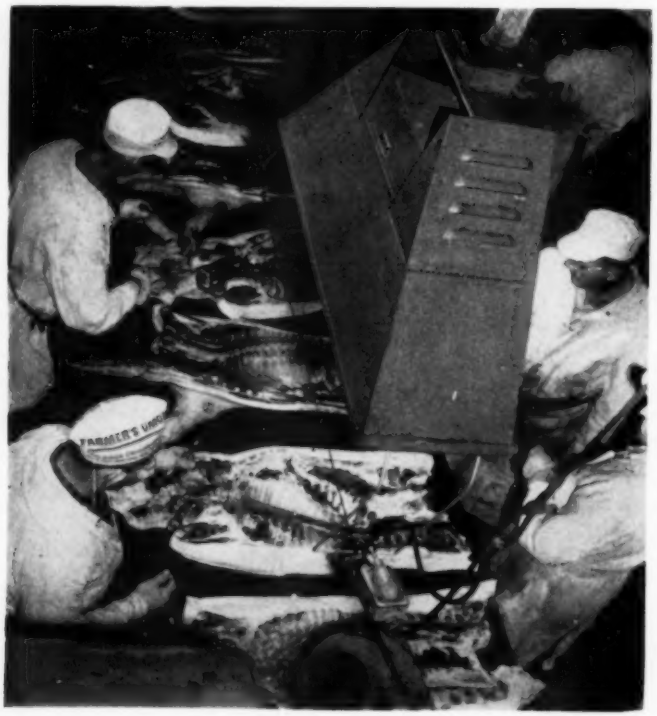
Another application of the projected shadow is a scale, provided with an illuminated dial, upon which a projected shadow gives a perfectly true reading, regardless of the angle from which it is viewed. It is not necessary to be directly in front of the dial to obtain a true reading. Parallax is eliminated.

Shadow Line Guides

One device, which has been rapidly growing in use in the lumber and woodworking field, is the shadow-line guide. After boards are cut from the log, they go to an edger, which trims away the waney or barkedges, leaving the board as wide as possible in each case without leaving much of the wane or bark.

It is then necessary to rip as close as possible to knots and other defects in boards without actually including any part of the defects. These and similar woodworking operations, including clipping of wood veneers on lines closely adjacent to defects, are highly variable. No good method of working real close and avoiding much waste was available until development of the shadow-line guide.

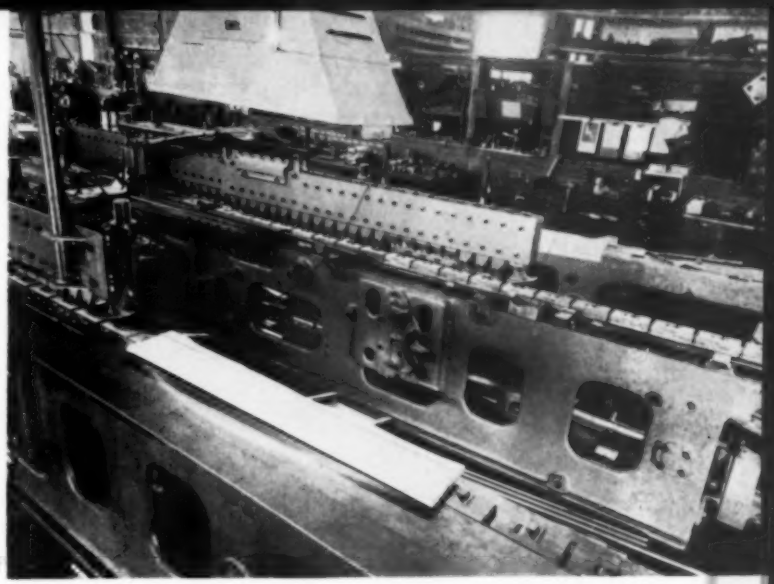
The guide-line light incorporates a special flared housing, placed above the working station. This housing contains a specially-developed electric lamp of high power in the form of a cylindrical bulb, with its axis horizontal. The lamp pro-



Packing plants employ shadow-line guides to aid in efficient cutting of carcasses. Note in this Carter Products Company photograph that as the carcasses are carried toward the cutting blade by the conveyor, they pass beneath a shadow-line guide.

Cut-registration marks were formerly used on the table or conveyor, so that operators on either side of the conveyor could line the carcasses up with them for cutting in the proper locations. However, these marks were often covered up with the carcasses and grease until they were of little value.

Now, a shadow line falls directly over the top of each carcass as it is carried along on the conveyor. Shoulders are slit off between the third and fourth rib, to prevent expensive pork chop meat from going into the cheaper shoulder stock. The shadow line makes it easy for the operator to line up each carcass so that it will be properly cut.

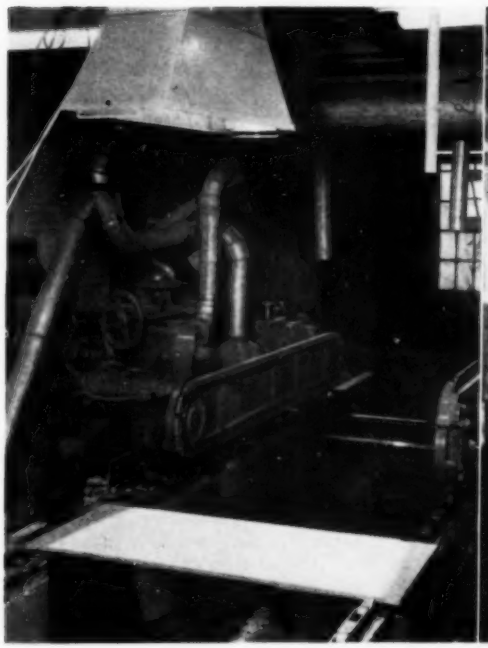


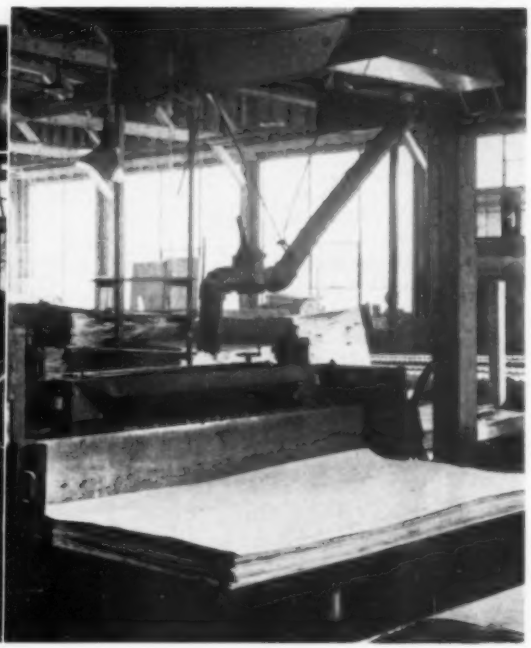
This is a Lindermann dovetail jointer used for joining boards edgewise. Unit cuts a tapered male dovetail along the edge of one board, a tapered female dovetail along the edge of another, applies glue, and slides the joint together until the ends of the two boards are flush. The shadow line on the workpiece has been retouched for photographic reproduction.

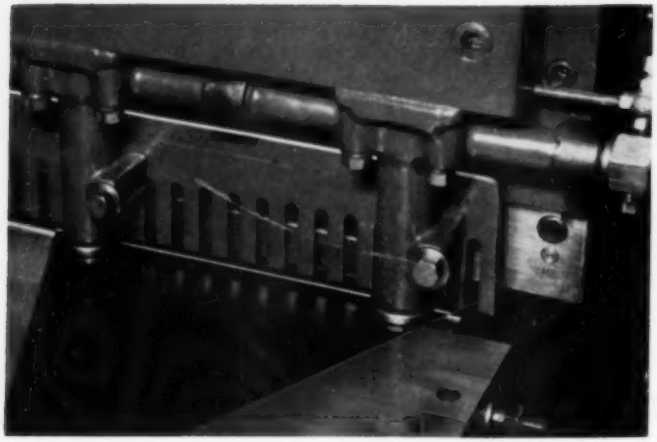
duces a very strong, white light. Just below the lamp, also horizontally mounted, is a special plano-convex lens, shaped in such manner as to pick up the light rays and straighten them into parallelism. Thus the rays are all traveling in the same direction. In the case of straight-line ripping operations, the rays travel directly downward. In the case of veneer-clipper and other applications, the housing is

Below, left—Plywood panels in various cases have matched-veneer faces, and trimming cuts on the ends must be correct in relationship to a center line of the match. Panels may be run through a double-end tenoner or a double-end cutoff saw with the center line of the veneer match registered with a shadow line, projected from the shadow-line guide. Note the shadow line across the center of the workpiece in this Carter Products Company photo. The guide line light applied to a Greenlee double end tenoner, is provided with a tilting adjustment, so it can be conveniently used for processing different lengths of stock.

Below, right—In laying up veneers to make plywood panels, all plies which are too small to permit full-sized panels to be subsequently trimmed out, must be eliminated. In this Carter Products Company illustration, a fence or abutment is arranged against which one edge of plies may be placed. A shadow-line light throws a line down on the other edge of the work. The operator can then easily check each ply to make sure it is sufficiently overwidth to insure a full-sized panel. The maximum amount of usable stock is obtained with the minimum amount of waste.







A light-beam guide has been incorporated in this Cincinnati Shaper Company shear for the shearing cut. The light and dark areas are cut off sharply. This eliminates the necessity of sighting from the end, or using some other inconvenient method of setting a scribed line under the shear blade.

often provided with a tilting adjustment, so the light rays can be directed at a selected angle from vertical.

Wire Provides Shadow Line

Across the lower and open part of the housing, below the lamp and the special lens, a wire is stretched. The unit, in the case of a sawing machine setup, is carefully adjusted so the shadow cast by the wire is precisely in the plane of the saw blade mounted on the machine. This shadow line falls on the board about to be ripped or edged. Thus, by positioning the board so the shadow line falls right along the edges of defects, one actually sees in advance, just before feeding the board into the machine, the line on which it will be ripped.

In veneer clipping setups, the shadow line is projected so it falls on top of the veneer on a line precisely in the plane through which the edge of the clipper knife descends. Therefore, by placing the veneer so the shadow line falls right alongside or tangent to a defect it is desired to clip out, the defect may be fully removed without wasting any veneer unnecessarily.

There is a variation of the shadow-line guide available, which is found worthwhile where the machine or device served is positioned close to other workers, who might be bothered by the strength of the light employed. The variation uses a so-called *light line* instead of a *shadow line*. The housing containing the light is baffled in such manner as to leave only a thin line of light shine through and fall on the work. The light line is employed in just the same manner as the shadow line would otherwise be used.

Multiple Line Applications

At sawmill edgers, gang ripsaws, and certain other locations, need often arises for having two or more shadow lines or light lines projected in parallel. It is possible, particularly with baffled housings providing light lines, to arrange and adjust baffle plates (and if necessary to install two or three lights) to obtain any desired number of light lines on the work in parallelism, and at any required spacing.

While applications of this general type are usually by means of special auxiliary devices, light-line or shadow-line provisions may be designed and built into machines. Note the illustrated light-beam guide incorporated in a Cincinnati Shaper Company shear.

Man-on-the-job is key to

Atlantic Steel Company's Safety Program

(*Continued from page* 61)

Hightower, assisted by *L. G. Dewberry, Jr.*, and *C. J. Blackmon*.

In March, "Safety on the Job" was emphasized, with Superintendent *T. W. Beiter* developing the basic program outline. Other topics to be covered in April and subsequent months include: protective equipment, handling the new employee, hand tools, and safety morale in the plant.

Executive interest in these programs is high, and every effort is made to let the participants know that the importance of this work is recognized. President *R. S. Lynch* and his staff serve as judges of each program, so they can honor the group producing the best program with an appropriate reward.

Good Approach

The necessity for exercising constant vigilance in the matter of safety to both men and machines is being constantly emphasized in most industrial plants, but Atlantic Steel Company's approach is somewhat unusual because it strikes so directly at source of accidents. Most accidents are caused by bad working habits. Safety and efficiency are one. As Safety Director *C. J. Vandeventer* emphasizes, "The man-on-the-job knows his job better than anyone else and he is the man pointing out the hazards and recommending preventive safety measures at Atlantic Steel."

Temco, at Dallas, Texas, details

Improved Work Methods

from the man-in-the-shop

Carbon Paper Saves on Router Operations

THE use of carbon paper in the making of router patterns is saving approximately 50 man-hours a week at Texas Engineering and Manufacturing Company, Inc., Dallas, Texas, and even greater savings are anticipated as Temco steps up its sheet metal operations.

Prior to introduction of the carbon paper technique, which was suggested by *J. C. Taylor* of Temco's sheet metal section, it was often necessary to make as many as 12 different identical patterns depending on the thickness of the material being used, and the number of parts called for. Each of these patterns had to be layed out and traced individually.

Under the Taylor technique, alternate sheets of pattern and heavy carbon are placed on the table, and the layout then is made on top of the stack so that one tracing of the template can produce as many as 12 identical patterns. The carbon paper used is of a heavy duty type which can be re-used several times.

Not only does the new technique reduce layout time, according to Temco officials, but in addition it works for greater accuracy in that all patterns produced at one time are absolutely identical.

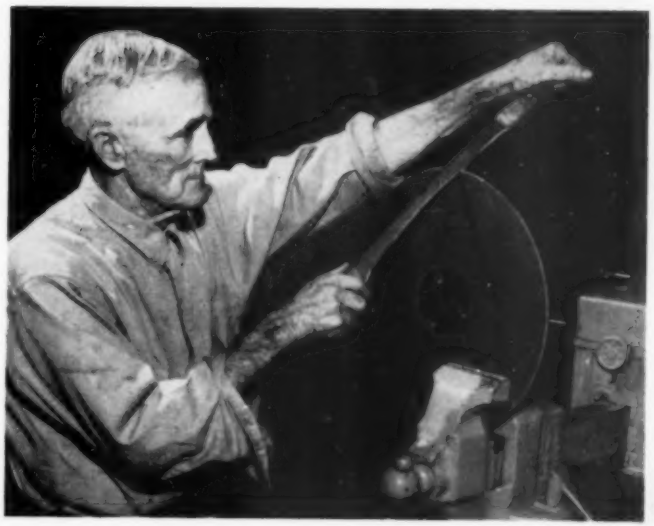
J. C. Taylor, of Texas Engineering and Manufacturing Company's sheet metal section, used carbon paper.

Disc Trimming Technique Simplified

DISCARDED power hack saw blades now are being used in Texas Engineering and Manufacturing Company's operations, to trim sanding discs to the exact size of backing plates and the result is a 50 per cent saving in man-hours and a considerable reduction in tool costs.

W. R. Lee, small tool repair employee, developed the process in an effort to improve the general industry practice of filing the discs to size with a wood rasp, which produced rough edges and wore out from two to three rasps each week.

Lee sharpened the edge of a discarded power hack saw blade, wrapped the ends with tape for handles, and used the tool as a draw knife to trim the discs. This process performed the operation in half the usual time, left neater edges and completely eliminated not only the using up of rasps, but also the wear on the backing plates which had resulted from the former method.



W. R. Lee, a small tool repair employee of Temco, used discarded power hack saw blade.

Modernization Notes

Power Plant Performance Data

at Bernheim Distilling Co., Louisville

By ROBERT COOPER, Instrument engineer,
Bernheim Distilling Co., Louisville, Kentucky

Power Plant Problem

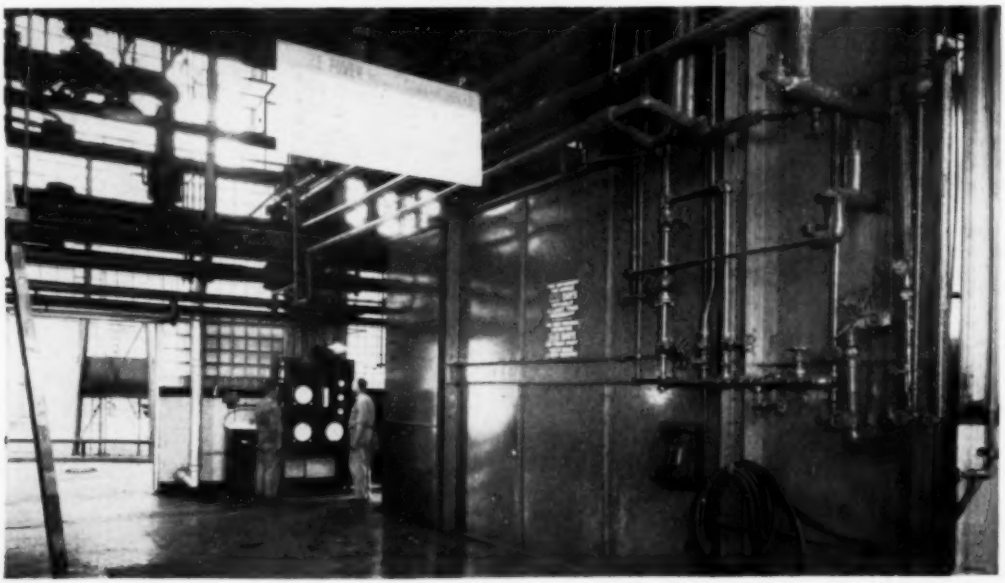
Need for additional large quantities of steam . . . Unsatisfactory smoke control . . . High and sudden changes in load requirements.

Corrective Measures

New boiler installation . . . Operating training course . . . Revamped and changed combustion controls . . . Change in size of coal . . . Overfire and underfire air change . . . Revamped system in order to eliminate dust in removal and handling of ashes.

IN 1945 the Bernheim Distilling Co. (a Schenley Distilling Corp. affiliate) of Louisville, Kentucky, was faced with the problem of disposing of its waste products without contaminating, or adding to, the city's sewer system. The solution resulted in the construction of a dry house where the moisture was removed from the spent mash, vitamins and minerals added, to make a high grade feed for various farm

Water treatment panel board is shown in center background of this general power plant view. Panel includes pneumatic pressure controller for exhaust steam to feedwater sedimentation tank; recording pressure controller (low pressure reducer) which reduces 185 psi to 125 psi for use throughout the distillery; temperature recorder for the feedwater heater; and a water level indicator for the sedimentation tank.



animals. The operation of these driers required additional large quantities of steam and it was found that the existing boiler equipment could not supply the required steam.

The boiler plant at that time consisted of two 487 hp Stirling boilers fired with chain grate stokers, two 150 hp HRT, and two 200 hp HRT boilers all fired with single retort underfeed stokers. It was then decided to replace the two 200 hp boilers with a 625 hp Stirling boiler fired with a spreader type stoker. Water cooled rear wall and partially water cooled sidewalls were installed, along with dust collecting system, induced draft, and complete automatic combustion control.

Smoke Control

Upon completion of the new boiler installation it was found that the equipment would carry the load, but smoke control was not entirely satisfactory due to the two remaining HRT boilers. Bernheim engineers, in cooperation with the Louisville Smoke Commission, decided to increase the rating of the three Stirling boilers to such an extent that the two remaining HRT boilers would no longer be needed. Feed water temperature was raised from 215 to 238 F, additional side wall water cooling was added to the 625 hp Stirling boiler, and complete side wall water cooling was added to the two 487 hp Stirling boilers. A complete change of water circulation, and gas baffling, was made to the two 487 hp Stirling boilers.

These changes resulted in increasing the nominal rating of the 625 hp boiler to 645 and of the 487 hp boilers to 533 each; raising the combined nominal rating from 1599 hp to 1711. The power plant was then able to produce the necessary quantity of steam without using the 150 hp HRT boilers which were the chief cause of producing offensive smoke.

Training Course

The changes described in the preceding paragraph greatly improved the smoke situation. However, it was felt that much more could be done in order to reduce the amount of smoke. An intensive training course was inaugurated to thoroughly familiarize all operating personnel in the correct operating procedures for efficient and smokeless operation. This program consisted of lectures, films, and round table discussion of proper power plant operation. Water tenders, firemen, and helpers all showed remarkable enthusiasm in this training program as demonstrated by the attendance record.

This response clearly shows the high degree of interest these men have in their work. Although it is felt that these men, who average well over ten years service with Bernheim, are thoroughly competent in their work, training, study, and experimentation will continue for this is a never ending task and improved methods will constantly be developed. The management of Bernheim feels that this training program was of tremendous importance as it is quite useless to spend money on equipment and controls unless the operators are proficient in the proper operation of the equipment.

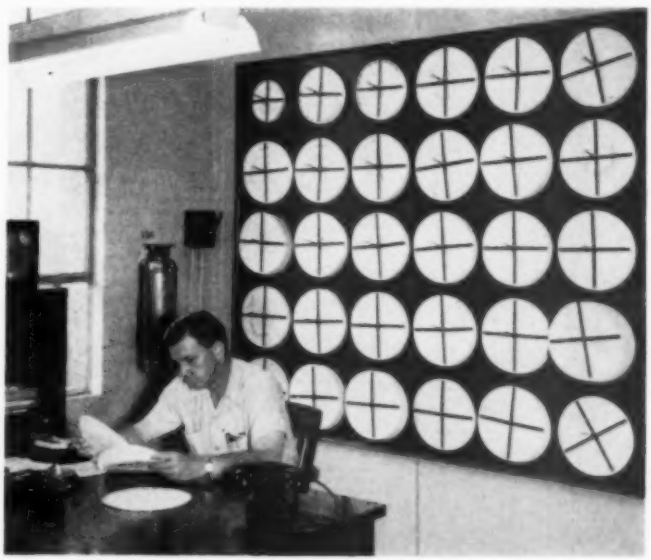
The program has paid off in numerous other ways. Maintenance costs have been greatly reduced, and the power plant force has a very enviable safety record. At the same time the engineers studied and experimented in order to determine the best possible ways in which to operate the power plant for efficient and smokeless performance.

Modifications

The following changes were made as a result of these tests:

1. Changed and revamped combustion controls.
2. Changed size of coal.
3. Changed overfire and underfire air.
4. Revamped ash removal system in order to eliminate all dust in the removal and handling of ashes.

It was found that in order to efficiently burn coal without smoke with the spreader type stoker, coal with a moisture content of not more than 10 per cent, was desirable while to obtain proper combustion with the chain grate stokers, coal with a moisture content exceeding 10 per cent was desirable. This presented the problem of burning coals with different moisture content while only one coal bunker was available. It was not considered



The author in his office. Note method of storing charts after they have been examined. Rods extending from the wall permit chart storage for a period of one year. Chart records are kept for a period of ten years.

feasible to use two coal bunkers as lack of space and additional expense would prohibit such an installation. We devised a method of tempering the coal by introducing exhaust steam into the bottom of the coal hoppers. This method has proved to be highly successful and several other plants have now adopted this system in solving their smoke problems.

Load Requirements

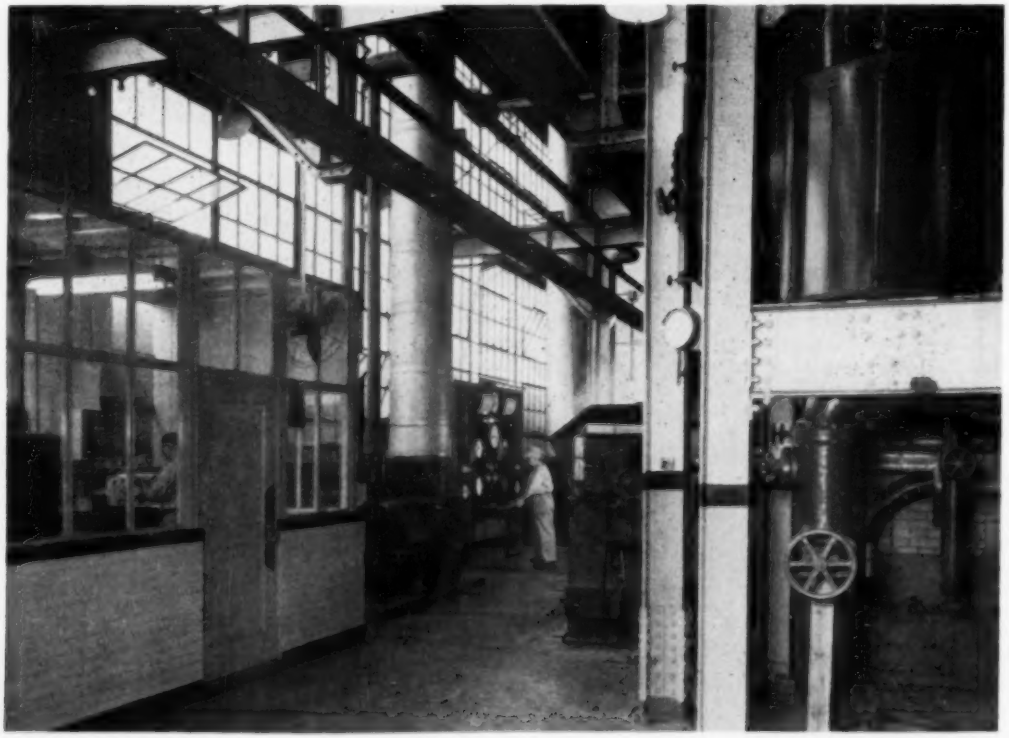
Another problem to be faced was that of high and sudden changes in load requirements. This is a problem in many industries, but probably in none to a greater extent than that found in the distilling industry.

A system for coordinating the steam demands of the dry house and both distilleries was inaugurated in order to minimize the total steam demand and the range of load fluctuation. It was then possible to remove the two chain grate fired boilers from automatic control, operating them at steady firing rates. This allowed these boilers to operate at improved efficiency with relatively little smoke. The variations in load were taken by the large Stirling boiler, which was able to take sudden changes in load without producing objectionable

Tabulation of Approximate Cost Data and Savings

Installation of 625 hp Stirling boiler	$150,000
Water cooled walls for 625 hp boiler	3,000
Water cooled walls for two 487 hp boilers	32,000
Coal tempering system	3,500
CO_2 recorders	950
Flow meters	3,250
Smoke density recorders	2,000
Overfire and underfire air changes	1,000
Combustion controls	5,000
Total Cost	$200,700
Annual fuel saving	30,000
Annual labor saving	37,000
	$67,000

General view of the Bernheim Distilling Co. power plant with combustion control panel in center background. Panel includes CO_2 indicator, smoke indicator, boiler horsepower indicator, steam flow recorder and water level indicator.



smoke, being equipped with complete automatic control.

Along with the above changes the following equipment has been installed to aid in the control of smoke:

1. Smoke density recorders on all stacks.
2. Flow meters and flow indicators on all boilers.
3. Meter for all demand load.
4. CO_2 recorders installed on all boilers, and
5. Automatic controls installed on all distilling and evaporating equipment.

In addition to the above, wet feeders have been installed on the spreader stoker in order to efficiently burn coal that has picked up excess moisture from shipping in wet weather.

Other Benefits

In the study and experimentation for the elimination of smoke it was only natural that other improved methods of proper plant operation would be developed. These methods have resulted in considerable benefits in addition to the savings listed above. Savings from correct water treatment, etc. have increased safe operating capacity, cut maintenance costs to a minimum, and of course the safety record cannot be computed in dollars alone. Thus, in addition to reduction of smoke, it is readily noted that the money spent has proved to be an extremely good investment.

Naturally, all of the corrective steps mentioned above were not made solely for the reduction of smoke, but in each case smoke abatement was a major, if not the sole, consideration.

We realize that neither the mechanical equipment including controls, nor the operators can maintain perfect smoke and dust free conditions, but we do feel that with our comprehensive program for training operating personnel and maintaining equipment and controls, we will be able to hold the emission from our stacks to a reasonable minimum.

Compressor problem

Units Too Large for Poured Foundations

What would you do?

COMIC-STRIP artists would have us believe the wife is the one who always makes changes in a new house as it is being built, but any engineer who specializes in design and erection of industrial plants will swear that it is the higher-ups in the company who make the changes.

Anyway—engineers supervising the erection of a compressor station, and working around the clock to earn a "promptness bonus" were advised that the compressors originally specified should be replaced by units of larger capacity—and consequently, larger over-all dimensions. Unfortunately, all compressor and drive-motor foundations had already been poured, and awaited only arrival of equipment.

A check of the bolt spacing for the new units against the old showed that it would be impossible to drill into the foundations and set new bolts — the replacements would come too close to the edge and would require abandonment of the pipe already laid out for the station.

Method Used

To adapt the old foundations, grooves or clearance slots were cut across the concrete bases to take four heavy channel iron beams on as many pairs of foundation bolts. Holes were cut through the webs of the beams to allow them to pass over the old bolts, which were then cut off flush with a torch and welded to the beams. New stub bolts were then welded to the upper side of the channels. The slots in the old foundation were correctly placed to allow the flanges of the channels to project downward and join into the new foundation extension as it was poured. A new form was then built, and a reinformed slab of the proper over-all dimensions cast over the old base, raising the base level six inches over that originally contemplated.

The compressors were levelled on these slabs, and grouted in place in the usual manner. To make connections to the piping which still followed the original layout, welding ells were used to get around the overhang of the slab, and sleeve-type unions were used where it was considered necessary to allow for possible dismantling of the line at some later date.

Increase in the horsepower—and consequently, the size—of the motors to drive the compressors was taken care of by the raising of the base level of the units through the casting of the slabs. The motors were carried on built-up foundations, but the difference in foundation bolt spacings was not as great as in the case of the compressors, and the bolts to fit the new pattern were welded to stubs of the former bolts. This was possible because these bolts were set in pipe nipples set into the concrete and the space around the bolts allowed the welding to be done below the eventual level of the motor base.

Although the units have been in operation for periods of time ranging only from a few weeks to as many months, no vibration is noticeable in the "pad-mounted" equipment and the revamped piping was so skilfully done that it appears to have been originally designed that way.

Bolt Breakage

Apart from the unusual forming and concrete necessary to provide the extension slabs on the foundations, the testing of the new bolts was the only procedure out of the usual run. Each bolt was tested with a power torque wrench after being welded to the beam, and the same torque was applied when bolting the equipment into place. This, it is hoped, disposes of the question as to what to do if a bolt breaks. It is hoped that the tests eliminated danger of bolt breakage —at least through over-stressing. —*Elton Sterrett, Houston, Texas.*

Electrically powered drawbridges solve

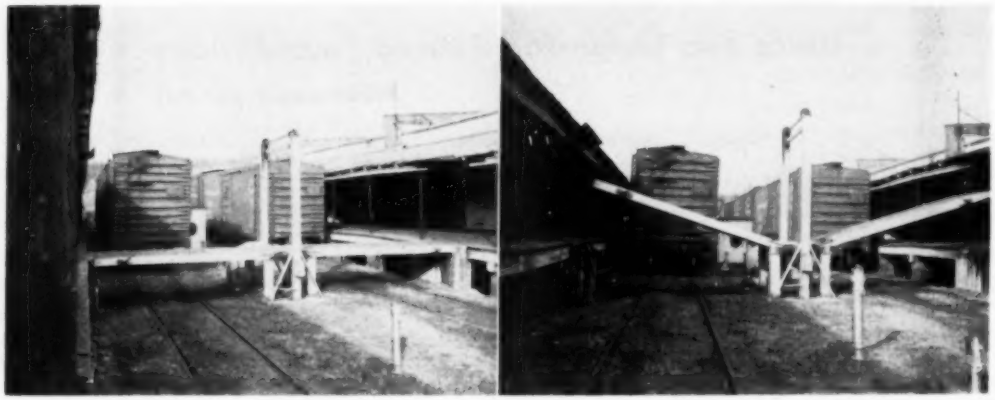
Inter-Building Handling Problem

in North Carolina textile mill

Steel decked, motor powered drawbridges replace hand lift, wooden decked units . . . engineers simplify material handling and reduce maintenance.

NO LONGER is it necessary for operators of fork trucks or hand trucks at Cone Mills Corp., in Greensboro, N. C., to laboriously place gang boards across railroad tracks from warehouse to warehouse or from warehouse to plant when moving loads of bales or beams. Electrically powered drawbridges, with push button controls, provide a safe crossing for even the heaviest industrial trucks.

Like so many other mills, Cone's plants in Greensboro and Hillsboro, N. C., are spread over several buildings separated by railroad tracks.



This typical drawbridge installation at Cone Mills Corp., Greensboro, N. C., is a double track type with support columns in the center. Bridge normally remains lowered (above left), being raised only when shifting of freight cars is necessary. Bridge starts to open in the above view; is about one-half open and then fully open in the illustration below. Pushbutton controls are located on both sides of the tracks. Width of bridge is seven feet.

Getting from the platform of one building across the tracks to the platform of another was a considerable job, especially with truck and load weights as high as 10,000 lb. Gang boards could safely handle small hand trucks, but something more substantial was needed for heavy lift trucks moving over wide double track areas.

For a number of years, hand-lifted drawbridges with wood decking had been used at several heavily traveled cross-overs, but these were hard to handle, wore out quickly, and required a lot of operating time in lifting and lowering them to permit shifting of rail cars.

The Engineering Department has now solved the problem by designing and installing electric motor powered, steel deck bridges which will serve for many years with very little maintenance. A total of five bridges are now in place at the three plants, two double track type at White Oak, two single track at Proximity, and one single track at Eno, in Hillsboro.

The design for the double track bridge and the single track bridge is similar except that it raises and lowers on only one side, the columns to which the bridge is lifted being placed on one side of the track instead of in the center between two tracks.

The bridge, itself, is constructed of structural steel channels covered with ¼ in. checkered steel plate. A width of seven feet was selected to permit plenty of room for maneuvering an industrial truck.

Hoisting is accomplished through ½ in. flexible wire hoisting ropes which run from each side of the bridge, over sheaves at the top of the support columns. The ropes then run down the columns to 12 in. hoisting drums located at the base of the bridge. These drums are powered by a 1½ hp (1 hp on single bridges) gear head motor with built-in disc brake coupled to a worm gear speed reducer resulting in a drum speed of 2.5 rpm. The bridge is raised in approximately two minutes at a hoisting speed of 8 fpm.

Pushbutton controls are conveniently located on the platforms so that operators on either side of the tracks may raise or lower the bridge. The bridge normally remains lowered, being raised only to permit the shifting of freight cars.

New Home for Warehouse Division of Atlantic Steel Company, Atlanta, Ga.

Warehouse Division, serving seven Southeastern states, to offer shearing, flame-cutting, and hack-saw cutting equipment facilities to metal fabricators and users.

ATLANTIC STEEL COMPANY, Atlanta, Georgia, will construct a new half-million dollar warehouse and office building at the corner of Northside Drive and 14th Street, Atlanta, for its Warehouse Division, according to ROBERT S. LYNCH, president of the company.

The primary reason for constructing the new building at the present time, according to Mr. Lynch, is that existing warehousing facilities of the division will be needed to accommodate the increased production to result from Atlantic Steel Company's new electric furnace which is expected to be in operation soon.

The structure will have 67,200 sq ft of warehouse and facilities space and 6,700 sq ft of air-conditioned office space. It will be located on a nine-acre tract now being graded.

The new location and facilities of the Warehouse Division will provide the company's customers with better service and a larger variety of steel warehouse products.

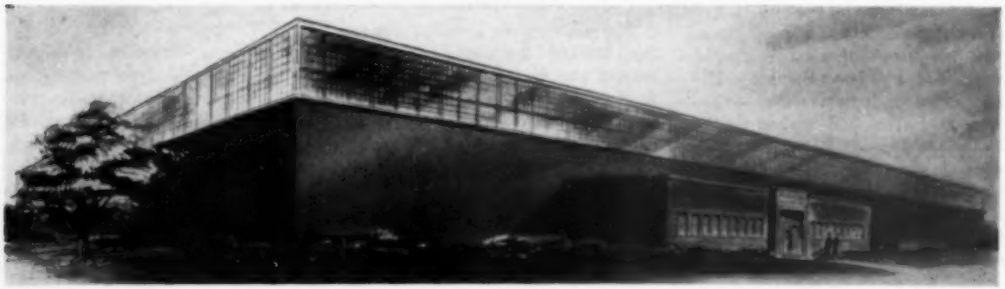
The structure is so designed that three railway cars at a time may be loaded or unloaded in the building's interior. Dock loading facilities will accommodate seven large trucks.

In addition to warehousing steel products for distribution throughout seven Southeastern states, the division will offer shearing, flame-cutting, sketch plate burning and hack saw cutting equipment facilities to metal fabricators and users.

Atlantic Steel Company established its Warehouse Division in 1947. It is operated separately from the steel mill itself and buys products from Atlantic Steel in much the same manner as other customers of the company.

The division sells large quantities of steel and copper products not manufactured by Atlantic Steel. Currently about 5 per cent of the total tonnage produced by Atlantic Steel is sold through its Warehouse Division.

Warehouse and office building of Atlantic Steel Company's Warehouse Division is scheduled for completion in early fall. Will give customers better service and a larger variety of steel warehouse products.



Goldtex Fabrics Corp., Rock Hill, S. C., describes how a

New Water Heater

By **LANIER M. ALLISON,**
plant engineer, Goldtex Fabrics Corporation, Rock Hill, S. C.

problem
- ▶ *To level extreme fluctuations of steam demand*
- ▶ *To speed up heating of water in dye vats*
- ▶ *To increase rate of flow of water from mains*
- ▶ *To make use of heat being wasted in return condensate*

GOLDTEX Fabric Corporation of Rock Hill, S. C., is a manufacturer of denims. Our current production schedules call for dyeing more than 30,000 lb of raw stock for filling each week. The filling and chain dyed warps are woven into denim. Then the cloth goes through the Sanforized process and is finished for use by the cutting trade.

A 1000 lb dye vat is used for raw stock dyeing, and steam to heat the water is supplied from two 125 hp HRT boilers. The hand-fired boilers also supply steam for heating, slashing, finishing, and for the "Sanforized" process. In moderate weather, steam demand is about 435 bhp.

For several years heating process water presented a problem in that the dyeing cycle made heavy steam demands over short periods, and the demands were greater than the boilers could supply. In fact, the arrangement for heating water for the vat was inadequate to dye the required amount of raw stock, and it was necessary to have some dyeing done outside the mill. The time required to heat process water was excessive, for it had to be heated in the dye vat from water main temperature to boiling solely by steam injected directly from the boiler into the vat.

Water pressure from the city mains was low because of the small lines (2 in.) leading into the dye room. This meant an excessively long time was required to fill the vat.

We also realized we were wasting a considerable amount of heat in letting the condensate return flash to atmosphere.

To overcome our problems we had to find some way to (1) level the extreme fluctuations of steam demand on the boiler, (2) speed up the heating of water in the dye vats, (3) increase the rate of flow of water from the city mains to the dye room, and (4) make use of the heat being wasted in the return condensate from the high pressure heating units throughout the mill. This sounds like a major project, and it was, but we have solved it in a satisfactory and practical way, and our calculations show that the investment in new equipment will be returned in less than two years. The estimated amortization is conservative.

New System

The only way we knew to reduce the demand fluctuations on the boilers was to install a hot water storage tank. The tank would have to have sufficient capacity to permit continual heating of the water and to supply sudden and heavy demands. We made a thorough study of the demands over a full 120-hour week, and plotted the hot water demand on a graph (see accompanying illustration).

The graph showed that at our current production rate, we could handle the widest fluctuations with a 5,000 gal tank supplied with 800 gph of 205 F water. Using such a tank, our boilers could heat water continually at the 800 gph rate, and there would always be enough hot water in the tank to take care of our heaviest demands.

We also decided to increase the size of the water lines from the city main to the dye room from 2 in. to 4 in., thereby making possible a flow of four times as much water.

Now, there is nothing particularly new or ingenious about installing a hot water storage tank and increasing the size of our water mains, but we do think that our new water heating and storage system as a whole has many features which make it a great improvement over standard systems. A study of the accompanying drawing will show the layout of the principal equipment.

Heater

A six-pass water heater located on top of the storage tank is designed so that any of its passes may be cut out as required. Immediately to the left of the top tank there is a condenser for the condensate return system. Note also that there are two circulating pumps at the foot of the storage tank. The tank has a cement lining to resist the corrosive action of hot

and Storage System

leveled steam demand and cut processing cycle

solution

- *5000 gal tank supplied with 800 gph of 205 F water*
- *Entire system made as automatic as possible*
- *Water lines increased in size from 2 to 4 in.*
- *Use of condenser for return condensate from plant*

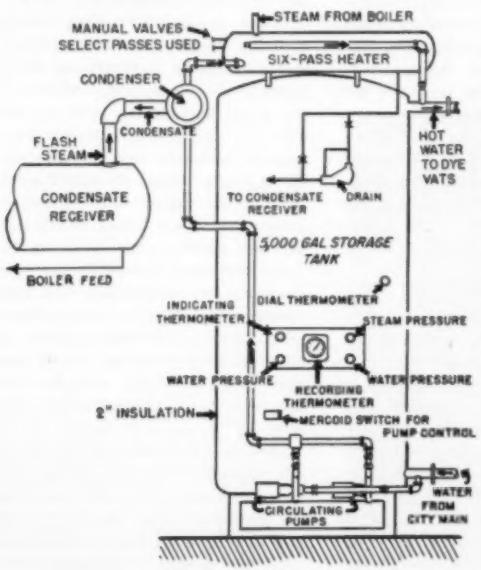
water, and the exterior is fully insulated.

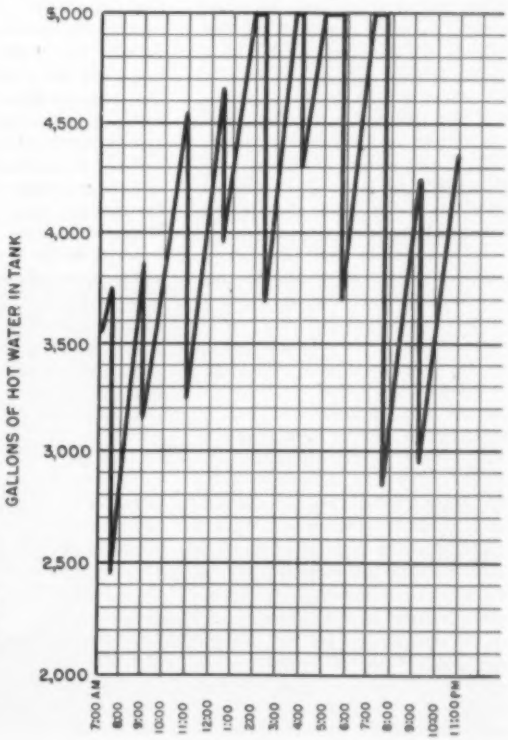
Operation

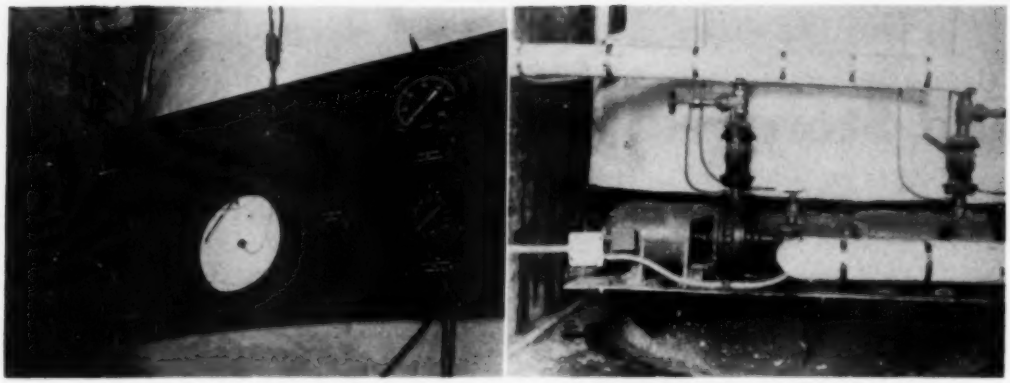
The storage tank stays full of water at all times and is under city pressure. The amount of hot water in the tank is not determined by the water level but by the *hot water* level. The tank contains both hot and cold water stratified into levels. Cold water from the city mains comes in and is later drawn off at the bottom of the tank. Hot water enters and is taken off at the top.

A sample graph, showing fluctuation of hot water demand in 16 hours is shown at the right. Figures are based on a 5000 gal tank and the originally planned constant heating rate of 800 gph. Hot water level in the tank through two typical shifts is indicated.

Sketch below shows storage tank, heater, and auxiliaries in present installation.







Control panel (left) for water heating and storage system. Two motor driven centrifugal pumps (right) circulate the water. One pump is a spare. Cold water is continually pumped out of the bottom of the tank, put through the heater, and returned to the top portion of the tank.

Somewhere between top and bottom, there is a sudden change from hot to cold, and cold water is continually being pumped out of the bottom, heated, and returned at the top.

If there has been a period of low hot water demand, and heating of water has continued at the regular rate, the hot water will reach nearly to the bottom of the tank, with just a small layer of cold water at the bottom. On the other hand, with a heavy demand for hot water, the hot water will be drawn off at the top, and cold water will flow in at the bottom until the tank is nearly full of cold water. However, with this 5,000 gal tank, all of the hot water is never used, despite the heaviest demand.

It is apparent that the correct calculation of demand and heating rate is important. Too small a tank or too low a heating rate would mean the tank would be emptied of its hot water in times of heavy demand, and cold water would flow to the dye vat. On the other hand, too small a tank and too high a heating rate would quickly heat all the water in the tank, stop the circulation, and prevent the recovery of heat from the condensate return. The optimium setting of heating rate would allow heat recovery at all times and impose a minimum steam demand on the boilers.

The design used for our heating and storage system requires circulation of water. The cold water must be taken from the bottom, run through the heater, and put back into the tank at the top. As long as there is any cold water in the bottom, the circulation must continue. We have duplicate electric motor driven centrifugal pumps to circulate the water. It can be seen from the drawing that cold water which enters at the bottom of the tank is pulled to the pump and forced out through a 2 in. pipe leading to the tube section of the small condensate condenser. The water picks up some heat there and continues to the six-pass heater where heat is supplied with live steam from the boilers at approximately 1½ psig.

From the heater the water moves into the hot water line leading from the storage tank to the dye vat. When hot water is being used, water from the heater joins the hot water from the top of the storage tank to supply the demand. If no hot water is being used, the water from the heater flows in the opposite direction into the top of the tank to replace the cold being pumped out at the bottom.

Condenser

The use of a condenser for return condensate from the plant has saved considerable heat which was formerly wasted. Cold water from the circulating pump goes through the condenser as it flows toward the six-pass heater. In this way it picks up the heat of the flash steam from the condensate. The condensate from all of the mill's high pressure heating units collects in the condensate receiver tank (see accompanying illustration). Here it partially flashes to steam, and it is this steam which is condensed in the condenser. As hot water the condensate returns to the receiver to be used as boiler feedwater.

Auxiliaries

Operation of the heating and storage system has been made as automatic as possible. A Mercoid switch is used to stop the circulating pumps as soon as the water in the tank is hot all the way to the bottom. The Mercoid switch starts the pumps when some of the hot water has been used and cold water has entered to replace it.

There is an instrument board mounted on the tank at eye level, and it contains a recording thermometer to show temperature of the water leaving the tank, an indicating thermometer for temperature of water leaving the heater, and a gauge to indicate steam pressure in the heater. Two pressure gauges show pressure differential between suction and discharge of the circulating pumps before the discharge passes through the metering valve. The pressure differential indicates the rate of flow. A thermometer mounted about ten feet up on the tank indicates the temperature of the water at that level.

Originally, we planned to use a heating rate of 800 gph, and we had calculated that we could speed up our dyeing cycle and save about 30 minutes on each batch. However, with the heater in operation, we

found that we could cut a full hour from the cycle by increasing our heating rate to 1,000 gph, which our heater could easily handle when using only four of the six passes. The time saved was well worthwhile.

We have found that our circulating pump operates 98 per cent of the time. This means our steam demand is almost continual, and usually there is some cold water in the bottom of the tank to be circulated and heated. On the other hand, we have found that there has always been sufficient hot water in the upper portion of the tank to supply our heaviest demands.

We kept our original steam lines leading directly from the boilers to the dyeing vat, and live steam is now used to bring the hot water from 205 F (as it comes from the tank) to boiling. The steam demand is light, and the slight fluctuations are nothing when compared to those formerly encountered when cold water was heated to boiling with live steam in the vat.

We had figured about 10 per cent reserve capacity in our dryer which dries the dyed raw stock, and we anticipated an increase of about 12 per cent in dyeing capacity with the new heater and tank. In operation, we can increase our dyeing capacity by 33 per cent, so it is now the drying capacity instead of dyeing capacity which limits our production rate.

Not only is the water heating and storage system doing more than we anticipated, but with the addition of more drying equipment, it will eliminate the necessity for having any dyeing done outside and will take care of any reasonable production increases in the foreseeable future.

Many advantages are evident to us from the installation. The tank supplies hot water for the vats in the indigo chain dyeing machine, increasing the machine's capacity to some extent. Boiler make-up water is supplied, and the elimination of the high demand peaks has materially increased boiler efficiency and made firing a much easier job.

Southern Tire Company reports on

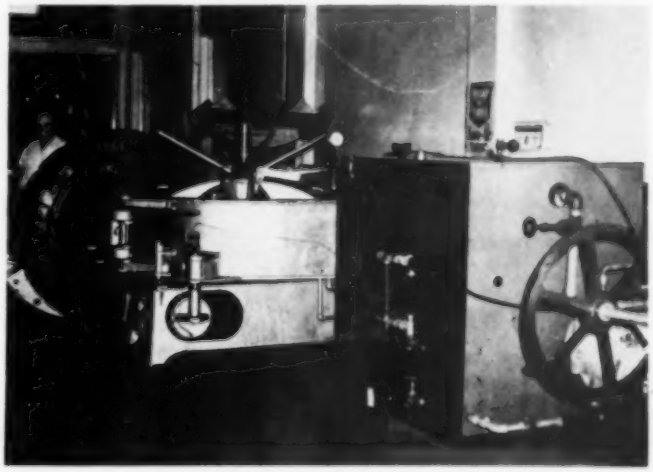
Steam For Tire Recapping

SOUTHERN Tire Company of Florence, Alabama, operates one of the most complete big tire recapping plants in the country, specializing in heavy duty tires for earth moving equipment. Some 18 months ago, the company installed 3 Bacon recapping molds and a vulcanizer. The Bacon mold handles up to a 2100 x 24 tire and the vulcanizer up to 3700 x 32 tire. The shop runs 24 hours per day, 6 days a week, but the molds are kept up to temperature 30 days per month.

Plant engineers wanted a boiler, which could be located inside the building without fire hazards, heat radiation and boiler tube scaling problems. Realizing the importance of having available precisely controlled 80 psi steam pressure, the company installed a Speedylectric boiler, manufactured by the Livingstone Engineering Company. Installation consisted of a 150 kw Speedylectric Model 500-15 with boiler feed and condensate return system. Results have been entirely satisfactory.

During 1950, the mounting volume of big tire recapping necessitated doubling the plant capacity and a second Speedylectric boiler of the same capacity was installed to handle 16 passenger, truck molds and vulcanizers through 1000 x 22. Boiler maintenance costs have been negligible and operation has been on schedule without interruption.

Although actual power costs are somewhat higher than oil or coal, the elimination of maintenance and labor costs in connection with the automatic Speedylectric largely offsets the difference in fuel costs.



Two 15 hp Speedylectric boilers of the Livingstone Engineering Company supply process steam for this huge Alabama tire recapping plant. Southern Tire, owned by Red Gaskins and George Babcock, specializes in heavy duty tires for off-the-road equipment used in mines, quarries, etc. Tire recapping calls for constant, steady steam pressure.

Maintenance superintendent in a Texas plant describes

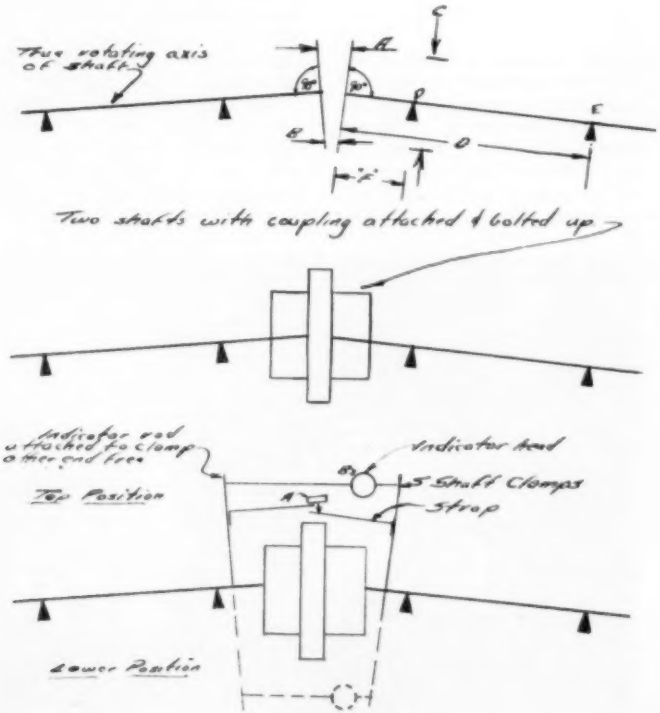
The Alignment of Shafts

from the rotating axle instead of from external surface

By W. H. Weaver, Maintenance Superintendent
Phillips Petroleum Company, Fullerton Plant, Fullerton, Texas

Method—This technique of shaft alignment is a departure from the usual method of using a taper gauge, straight edge or single indicator. It is not radical, but the results are. It aligns the shafts from the rotating axis rather than from the external surfaces. For this reason it eliminates mis-alignment caused by crooked shafts and worn or eccentric bored couplings.

Application—Method works on the principle that a shaft supported in two places, when rotated, will turn on an axis located in the center of the shaft at the bearings where supported. Rotating axis will not be in the true shaft center, except at the support points, if shaft is bent or sprung. When two shafts are aligned by this method, each supported by two bearings, rotating axis through the four bearings will be on a line, both vertically and horizontally. Technique shows the angular deflection and vertical or horizontal mis-alignment of shafts from the rotating axis at the coupling.



VISUALIZE a shaft being supported by two bearings, as are pumps, electric motors and turbines. If a clamp with an arm projecting in line with the clamp is attached to one end of the shaft, the arm will be perpendicular to the shaft. When the shaft is rotated the clamp arm will rotate on the rotating axis regardless of the amount of kink in the shaft.

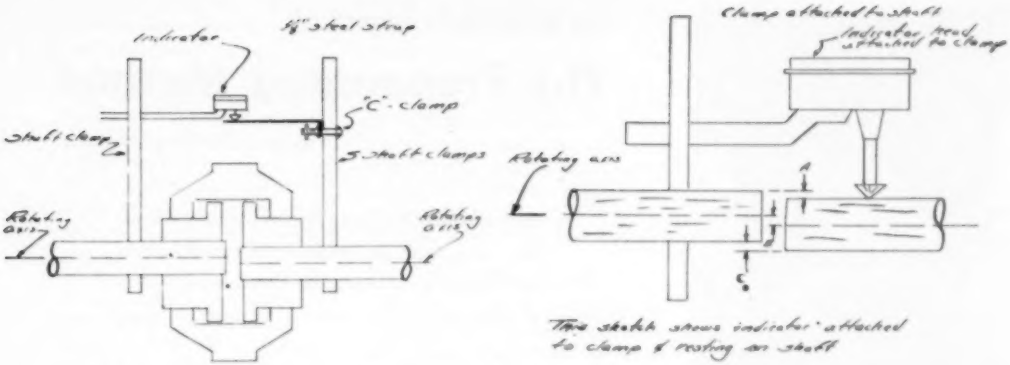
When two shafts are to be aligned, a clamp is placed on the end of each shaft and the coupling connected so the shafts will rotate together. By placing indicators on the clamp arms, the amount of mis-alignment can be measured. Then definite steps can be taken to correct the mis-alignment.

Technique

With reference to the accompanying sketches, the angular mis-alignment can be measured in both the vertical and horizontal planes when an indicator is placed between the clamp arms at point A and rotated to position B. This will record the amount of deflection between the shafts' rotating axes in the dis-

These sketches apply to vertical or horizontal angular deflection. Indicator A records misalignment of shaft ends and B records the angular deflection between shafts.

With reference to the sketch at the upper left, A-B = deflection in distance C; A-B - C = deflection per inch; Deflection per inch x distance D = correction at point E; and Deflection per inch x distance F = correction at point P.



tance c. By turning the two shafts 360° a maximum and minimum distance between the arms will be found (180° apart). A piece of flat bar stock approximately ⅛ in. x 1 in. is fastened to one of the clamp arms with a small "C" clamp. An indicator is then attached to the other clamp arm, so that the indicator point will be in the approximate position of the shaft arm. Dividing the indicator reading by 2 will give the amount of deflection between the rotating axes.

Note the sketch in the upper right hand corner. A, B, and C are equal. When the assembly is rotated the indicator will record A plus C, which is twice B. Therefore the indicator reading must be divided by 2 to determine the true value of the distance b. If one shaft is required to be 0.010 in. low or high from the other shaft, the indicator reading will be 0.020 in. when the assembly is rotated through 180°.

Plant Tested Method

This method of shaft alignment has been used for over three years at the Fullerton, Texas, plant of The Phillips Petroleum Company. For example, we have one multi-pump unit driven by a 150 hp electric motor at 3580 rpm. This unit had to be shut down at least once a month to replace the packing or bearings in one or more of the pump units. This necessitated having the distillation down approximately 4 hours each time—a loss of about 12,000 gallons of product. These units were checked repeatedly using the straight edge and taper gauge method on the couplings. They appeared to be in alignment.

When this unit was aligned by the method outlined above, it operated 20 months before a shutdown, and the latter was made to replace packing. On this one unit alone, we realized a saving amounting to approximately 240,000 gallons of product.

This improved maintenance method was submitted as an Operating Kink entry in the Permian Basin Regional Meeting of the *Natural Gasoline Association of America*, held in Odessa, Texas, late in February, and is published through the courtesy of the association's secretary, *William F. Lowe*, Tulsa, Oklahoma.

Other operating kinks, ideas, tools, methods, and devices, presented at the Tyler, Texas, and Amarillo, Texas, regional meetings of the NGAA, are published each month in SP&I's expanded Helping the Man-in-the-Plant section.

The New Simmons Company Plant—Dallas, Texas

New Dallas, Texas, fabricating operation of *The Simmons Company*, one of the nation's largest manufacturers of bedding equipment, accommodates straight-line mechanized production of the various products to be distributed in the Southwest. *The Austin Company*, engineers and builders, completed the huge integrated structure in ten months.

The one-story structure, combining manufacturing, assembly, final stock storage and office space under one roof, consists of a structural steel frame designed with 50 and 80 ft span trusses. Manufacturing and assembly building is approximately 700 ft long and 310 ft wide, and attached offices 425 ft long and 40 ft wide. Standard H-section welded trusses in the framework accommodate an endless variety of mechanical handling facilities. Lighting is fluorescent and incandescent fixtures with an average intensity of from 20 to 25 foot candles.

An up-to-date report on

The Trepanning Method

in machining metals

The trepanning machining method produces reasonably large holes by cutting a cylindrical groove and removing the center as a solid core, instead of removing all the metal in the form of chips.

Adapted from comments by *Fred W. Lecht*, development engineer of the Carboloy Department of General Electric Company.

Typical trepanning head used for the drilling of gun barrels. It is entirely feasible to convert existing deep hole boring machines or lathes to such work.

TREPANNING is at once one of the most modern and one of the oldest known methods of machining. Of particular interest at present is the application of the process to the drilling of gun barrels at a rate impossible with boring tools or conventional spade drills.

Holes up to 30 or 40 ft or more in length and up to 4½ in. diameter have been produced in steel forgings in this manner, and to tolerances of only a few thousandths as to concentricity and diameter.

The advantages of the process however are not confined to deep holes. The process may be applied equally well to the producing of through holes in such parts as gear forgings etc., thereby greatly reducing machining time. Accuracies in general will be better than when drilling, provided the equipment used is satisfactory.

In general, the savings in time obtainable by deep-hole trepanning with carbides as compared with producing the same hole with high speed steel drills may run as high as 95 per cent. Part of this saving of course is due to the higher cutting speeds and feed rates made possible by the carbide tip used on trepanning tools. However the major part of the saving is still due to the simple fact that far less metal has to be removed in the form of chips.

Carbides Used

Trepanning of course is a *natural* for carbides, for the following reasons:

The long life of the carbide insures continuity of cutting, as well as maintenance of closer tolerances as to diameter at the end of the bore as compared with the diameter at the beginning.

Higher cutting speeds and feed rates are possible with carbides.

The trepanning cutter body carrying the trepanning cutter blade must be protected against wear as it bears against the ID of the hole. Here again, carbide wear strips provide an excellent answer.

Proper carbide speeds can be obtained over entire cutting edge of a trepanning tool. (The dead center on a spade type drill makes it unsuitable for carbides).

Conversion Factors

At the present time there are few machines built in this country which were designed specifically for trepanning work. However, it is entirely feasible to convert existing deep hole boring machines or lathes to such work.

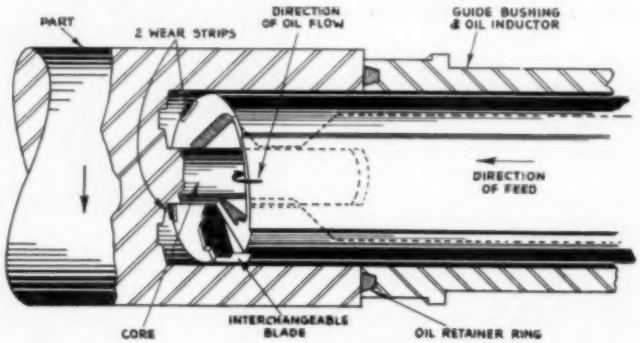
Case History

Following example gives an idea of savings possible by trepanning instead of drilling:

Work—18 ft long, rough turned steel forging; *Hole*—2 13/16 in. to be produced entire length; *Feed*—.008 in. per revolution; *Speed*—550 SFPM (747 rpm) at outer edge of tool; *Accuracy*—Hole held within .003 in. for size, and within .012 in. for alignment.

At speed and feed used, total feed was 6 in. per minute, giving a total cutting time of only 36 minutes. This compared with an established drilling time of 15 hours when using high speed steel spade drills including time required for three drill changes.

Cut-away diagrammatic sketch showing trepanning head slightly retracted after starting a cut.



Chief requirements for a trepanning machine conversion are:

1. Adequate motor horsepower. In the case history cited, 46 hp was required. 60 hp or more is usually desirable for good performance, depending on hole size and material.
2. An oil pump capacle of delivering 25 gpm or more, at a pressure of at least 175 psi was required for the above mentioned job. The volume of oil required will vary of course with the hole size.
3. A carriage fixture to support and permit accurate feed of the tube on which the trepanning tool is mounted.
4. An oil inductor bushing and support which also provides an oil seal at the entrance end of the bore.
5. Steady rests to support the work.
6. Centralization of all electrical controls and indicators at or near point of chip outlet.
7. Variable speed control for the motor.
8. Gearless headstock.
9. Cutting fluid temperature and oil pressure gages.

Horsepower requirements of course are governed by rate of chip removal. The high power required is due to the ability of the carbide to remove chips so rapidly.

While 175 psi is given here as a minimum of oil pressure, higher psi values are frequently desirable. Much work has been done already in trepanning at pressures as high as 200 to 400 psi. The higher pressures of course require better oil seals.

There are several reasons for the high oil pressures required. First the cutting fluid must effectively wash out the chips as rapidly as they are formed. A sufficient supply of cutting fluid must also flow rapidly enough to prevent any marked rise in either cutting fluid or work temperature. Last but not least, the cutting fluid must provide adequate lubrication and cooling for the carbide wear strips. A cutting fluid with a 10 per cent sulphur base seems to be quite popular for this type of work.

Uniform control of tool feed presupposed the use of accurate lead screws to feed the tool into the work as the work revolves. If a machine considered for adaptation to trepanning has been used a great deal for one length of work which required the carriage to move over the same place many times, it may be found that because of lead screw wear in this spot the screw should be replaced to insure uniform feed over the entire travel of the carriage.

Trepanning Cutter

The trepanning cutter head is attached to the non-revolving drive tube. Two types of cutter blades are currently used, a $\frac{3}{4}$ in. wide cutter blade for holes $1\frac{3}{4}$ in. up to as large as 8 in.; cutter blades $1\frac{1}{4}$ in. wide have been successfully applied to trepanning of large sized bores. Selection of cutter blade size depends considerably on operating conditions and horsepower available. With the $\frac{3}{4}$ in. cutter blade, oil is fed under pressure to the cutter head through the space between the drive tube and the I.D. of the hole and is discharged along with the chips through the space between the I.D. of the tube and the core. With the larger cutter blade, the flow is reversed, since it has been found that discharge of the cutting fluid and chips around the periphery of the drive tube is advisable when trepanning larger holes.

For additional and more specific information on trepanning techniques, readers of *Southern Power & Industry* should direct their inquiry to the author, Carboloy Department of General Electric Company, Detroit 32, Michigan.

National Gypsum's Paper Mill—Pryor, Oklahoma

National Gypsum Company's new paper mill at Pryor, Oklahoma, is now in operation and will supply up to 150 tons of paper liner a day to National's three gypsum "board" plants at Rotan, Texas; Fort Dodge, Iowa; and Medicine Lodge, Kansas. Designed and constructed in the unusually short time of ten months, this fourth paper plant makes the Company entirely self-sufficient for its paper needs, according to *Lewis R. Sanderson*, President of National Gypsum Company. The company's operations in the Southwest are completely integrated.

The 125,000 sq ft plant uses as raw material ground wood, sulphite, and several grades of waste papers which are converted to the finished product by a 450 ft long Black-Clawson paper machine. Paper produced in the mill is used in the manufacture of fireroof gypsum board products including gypsum, lathe, wallboard and exterior sheathing. In order to control stream pollution a Save-All unit was installed to clean waste water leaving the plant. Paper fiber thus recovered is pumped back into the processing operation.

Paul J. Dumas is Plant Manager of the Pryor, Oklahoma, operation; *Eugene E. Hooe*, Mill Superintendent; and *Robert L. Harris*, Maintenance Supervisor.

Natural Gas Firing and Control for Boilers

By WILLIAM J. WHATLEY

Mechanical Engineer,
Wyatt C. Hedrick, Architect and Engineer
Houston, Texas

Many boilers are being fired with natural gas due to more and larger "Big-Inch" lines from the fields to the consumers, and the ease and cleanliness of operation.

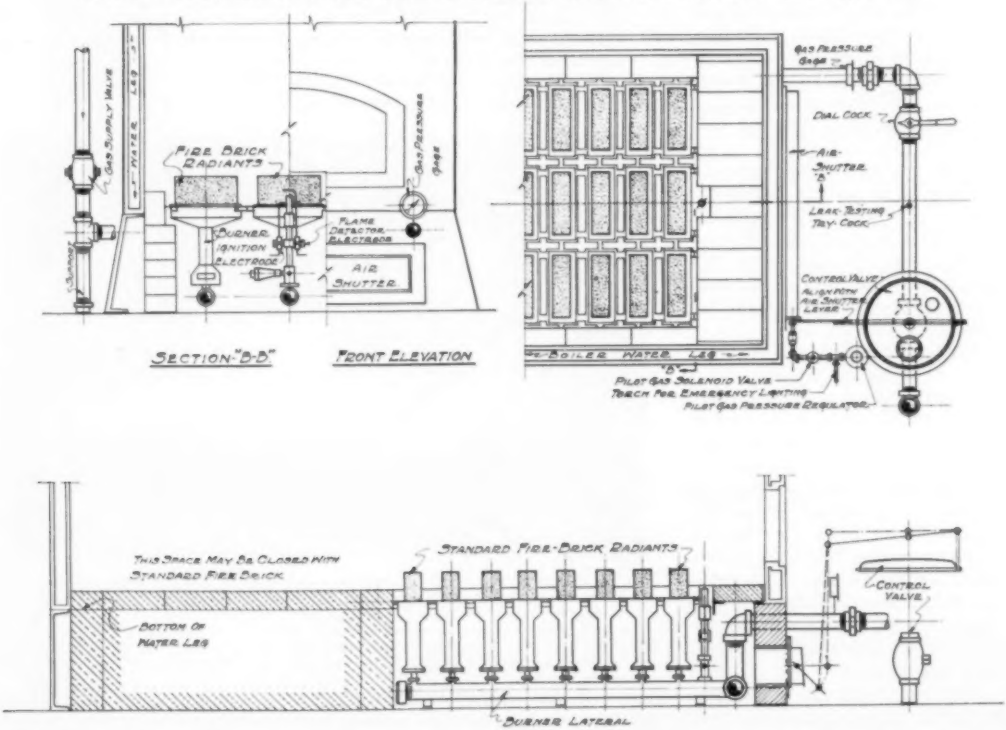
MANY operators are wary of gas because they know it is a highly inflammable substance which will burn freely and leak at every conceivable place and opportunity. It is well to know the possible and inherent dangers with any fuel which is to be used, in any plant. And in addition, special construction of piping, valves and systems for handling gas must be carefully followed, in order to have a satisfactory operation.

Natural gas has its own peculiarities, as does any other class of fuel, but once they are known and thoroughly understood the operator has no greater fear of this system of firing than he would with any other system—even coal, with which he has probably had the most experience on boiler firing.

Natural gas has a specific gravity (usual), of 0.63, compared with air at 1.0, and requires about 17% excess air for firing. The average heat content is 1000 Btu per cubic foot. The following formula will give a pretty close figure for amount of gas necessary to supply the usual steam heating boiler:

$$Gh = \frac{EDR \times 240}{0.7 \times B}$$

Fig. 1. Shows the plan, elevations and sections of an installation of burners and piping for firebox type boilers.



where: Gh is gas demand per hour, EDR is manufacturer's rating of boiler in square feet of equivalent direction radiation, B is heat content of natural gas (1000 Btu).

A good rule of thumb method of estimating gas requirements is to use 1.3 cu ft of gas per hour per pound of steam generated.

Gas and air flow vary with the square of the load, and the load varies with the square root of differential through the boiler or the burner.

Automatic Controls

With gas firing, a system of automatic controls is a necessity. The controls perform several services which generally promote safety, efficiency, and economy. Among their various advantages are the following:

(1) Maintain Steam Pressure

It is physically impossible to maintain uniform steam pressure by manually controlling combustion. Uniform steam pressure gives higher turbine or engine efficiency, a stable water level and more consistent results where steam is used in process work.

(2) Save Fuel

Automatic controls maintain proper fuel-air ratio over the entire operating range of the boiler. Excess air means waste of fuel as all air passing through the boiler must be heated from room temperature to the stack temperature of several hundred degrees. Therefore any air in excess of that necessary for smokeless combustion represents waste of heat. The greater the quantity of air passing through the boiler, the greater the velocity, and the less time for heat absorption by the boiler. This results in still higher stack temperatures and still lower efficiency.

(3) Save Time

Manual control requires constant attention and watching, but with automatic control, the operator is released for other duties. It is not to be believed, however, that automatic controls will absolutely solve the problem for the operator, and that he will be able to forget this item of the operation. A competent operator is always necessary.

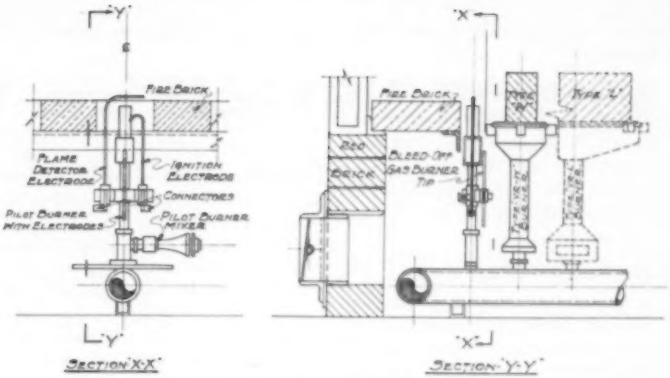


Fig. 2. Drawings showing pilot details.

The use of automatic controls simply makes his operation safer and his load a bit lighter. Unless automatic controls are properly maintained they will not perform efficiently and protect against boiler explosions.

Extensive use of automatic combustion controls has been customary in large central plants for a number of years, but their use is now also becoming quite general for the smaller heating plants and boilers. Most installations at the present time are being specified in detail and complete detailed shop drawings are required of the manufacturer before the installation is made. This enables the engineers, the owners and the operators to get thoroughly familiar with the system to be used. In addition, the engineer's original specification usually requires the control manufacturer to supervise the installation, put the boilers in satisfactory operation, and instruct the operators on the job for a minimum period of two weeks. In this manner, all hands get practical operating experience and data, and become familiar with the system.

During the installation, the operator should ask as many questions as he feels necessary to become familiar with the job. Such questions do not indicate ignorance, but an honest desire to learn. The operator should learn the details of the entire operation as well as the name and function of every working part. He should know the best, quickest and easiest way to convert to manual operation, in case of failure of any part of the automatic system. He should be able to locate the cause of failure, correct the trouble, and revert to automatic operation as quickly as possible.

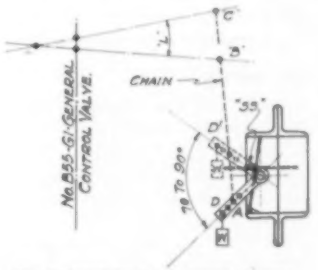


Fig. 3. Detail for Adjustment of Louvre. Set position "A" so that opening of louvre equals 10° to 90° in travel of angle "L" from closed at "B" to fully opened at "C" on control valve. Tighten chain with louvre in closed position by shifting lever "D" by means of Allenset-screw "SS".

(4) Increase Boiler Output

Proper controls permit working closer to the boiler's capacity and pressure limits without exceeding them. Corrections are made before conditions get out of hand. Proper controls also permit good use of the available draft.

(5) Save Furnace Maintenance

When too little air is admitted, the boiler furnace temperature may become excessive, with resultant burning out of the refractory furnace lining. This may re-

sult in costly delays and shutdowns.

(6) Prevent Smoke

When too little air is admitted, smoke is formed. This fouls the boiler with soot, and thereby decreases heat absorption and causes additional waste of unburned fuel.

(7) Permit Savings

Automatic controls save a great deal of money in the course of daily operation, as they conserve fuel, reduce maintenance, improve operation, and result in less supervision and less overall expense. Their cost can quickly be amortized because of the above savings.

(8) Safety

In the average industrial plant, the greatest consideration of all is, perhaps, that of safety. Automatic controls are not fool-proof, but they are extremely useful if proper care and attention are given them. The majority of automatic devices will give ample warning, either during regular operation or at the time of testing, that they need attention. Then is the proper time for correction, but too often the careless or ignorant attendant merely blocks-off the control and assumes that conditions will be all right. Many accidents have resulted from such negligence.

SPECIFICATIONS

A typical specification for controlled gas combustion as applied to steel steam heating boilers (5 to 15 psig) will now be outlined.

General

Contractor shall supply and install, in strict accordance with the manufacturer's drawings and instructions: Gas burners and automatic combustion and safeguard controls, to develop low pressure steam from a Kewanee Type "C" 7L84 Boiler, or equivalent, equal to SBI output rating of 3,643,000 Btu. Contractor shall supervise the installation and make final adjustment of burners and controls, and spend enough time with owner's operators to fully acquaint them with the details and operation of the burner-control combination.

Burners

Burners must have capacity to complete combustion of 5,465,000 Btu of natural gas when gas pressure is 6.3 inches water column at the burner pressure gauge.

Burners shall be of the vertical radiant type, consisting of steel pipe manifold with proper pipe supports, with two-piece gas limiting orifices made of brass, with multiple nickel-iron burner heads supported thereon, and so arranged that uniform heat distribution in the firebox is accomplished. Burners shall have fixed port areas and be so constructed that standard No. 1 firebrick may be used for radiants, and for protection of burners, but shall be so constructed that cracked, spalled or chipped firebrick radiants will not affect the proper operation of the burners. Burners shall have balanced vane louver of 445 square inches free area for control of air to the burners. Burner manifold shall have a fixed bracket assembly for location of the flame rectifier pilot assembly in fixed relation to the burner assembly. Burners shall be equal to John Zink Type Vr-411 W, with 4" NPT connections.

Combustion Controls

Contractor shall furnish combustion controls consisting of the following items, or an approved equal:

1—Minneapolis-Honeywell Y223B package consisting of R190B Protecto relay, C7005B4 flame rectifier pilot assembly, and #22042 ignition transformer.
1—Start-stop switch with toggle switch and green signal light for main control valve.
1—M-H type P404A Pressuretrol, 0 to 10 psi.
1—M-H type C402A low water control, 25# SWP.
1—⅜" Pilot gas regulator for 3" wc pressure.
1—Gen. Controls Type B55-G1 electric diaphragm control valve, size 4".
1—ACF #125 lubricated plug cock cutoff valve with handle and #63 lubricant, size 4".
1—ACF #D 427 dial indicating firing cock with handle and #63 lubricant.
1—Pilot cock, dial-indicating type.
1—Flexitite emergency hand lighting torch with 6 ft hose and stop.

The above controls shall be so arranged that high steam pressure or low water condition will cut off gas to the main burner, and pilot failure or electric current failure will cut off gas to main and pilot burners. Starting and stopping of pilot is to be accomplished by push button control through electric ignition, and thereafter main burner may be cut on or off by manual toggle switch, pressuretrol, or low-water cutoff. Lubricated cutoff valve shall be located ahead of all other valves and closing it shall cut off all gas flow. Gas firing gauge shall be located between burner and dial firing valve, and ⅛" try-cock shall be installed between firing valve and electric diaphragm control valve, so that daily tests for leakage of the control valve may be made. Pilot gas system shall be installed between control valve and cutoff valve and shall be in the following order, beginning at the fuel line: pilot gas regulator emergency lighter torch, pilot solenoid valve, and indicating valve.

Electrical

All wiring shall be done in accord with all local and National Codes. 24 inches of flexible Greenfield shall be used at the solenoids and the Pressuretrol, and low water cutoff.

Current of 115 volt-60 cycle shall be supplied to the feed line switch directly from the master fuse box, so that an interruption of circuit by opening lighting circuits or some other circuits than the heating plant circuit will not interrupt the firing controls. The Type R190B Protectorelay shall be mounted in a location that will be convenient for the operator to reach the push button while in position to observe the lighting of the pilot through the boiler firing doors, and shall be mounted with ½ in. spacers behind the box so that an air space of not less than

(*Continued on page* 96)

ELECTRICITY and ELECTRIC POWER

Part 3—Transformer Application

What they are and how they work . . . typical plant applications . . . delta-wye, delta-delta, wye-wye, and wye-delta . . . scaler quantities and vectors.

By ROY W. WAGES

Division Industrial Power Engineer
Georgia Power Company, Columbus, Georgia

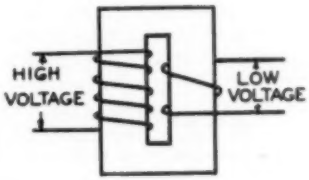
Part 1 of this Electricity and Electric Power series—*Volts, Amperes and Watts*, starts on page 58 of the January issue. Part 2—*Alternating Current Motors*, was featured in the February issue, and Part 3—*Controls for Alternating Current Motors*, starts on page 84 of the March issue.

ALMOST all of us that work in industrial plants know that a transformer is a device that raises or lowers alternating current. There are few industrial plants that do not have some transformers, either power or lighting transformers, in addition to those owned and furnished by the local power company. Since, at one time or another, plant electricians or maintenance men may be called upon to work with transformers, we have included a discussion of transformers in this series of articles for *men in the plant*. We will limit our discussion to background and to practical points of interest to men in the plant and, by so doing, try to answer some of the questions that have been asked us by our friends in industry.

What Is a Transformer?

Our reliable reference work, "American Standard Definitions of Electrical Terms" states that a transformer is "an electrical device, without continuously moving parts, which by electromagnetic induction transforms electric energy from one or more circuits to one or more other circuits at the same frequency, usually with changed values of voltage and current."

That definition is complete and proper; but to most of us, the word *transformer* means a device that raises or lowers the voltage of an alternating current system. There are current transformers, to be sure; but the common type that most of us are concerned with is the voltage or potential transformer. And it usually brings to mind a picture such as this:



In its simplest form a transformer consists of nothing more than a steel core wrapped with two coils of wire similar to that illustrated. Of course transformers are not usually employed in such a simple state. Generally the core and coils are put in a shell of some kind and then immersed in oil. Some transformers often have even more frills. But no matter how complicated they look; stripped of all their frills; transformers consist basically, of a core and coils.

Transformers are the one big reason for our using alternating current today instead of direct current, because the chief advantage of alternating current over direct current is its virtue of being easily raised or lowered from one value to another. Direct current cannot be raised or lowered by any simple means. There are *no* direct current transformers.

When you consider what a problem it would be to transmit electric power at 240 volts, 460 volts, 575 volts, or even 2300 volts over great distances, you can readily see what a great boon the transformer is to users and distributors of electricity. We will discuss the economic distribution of electricity, line losses, etc., in great detail in a subsequent article.

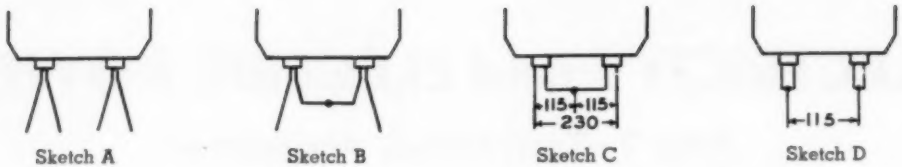
How Does It Work?

It works very simply—there's nothing mysterious about it if we will view the problem from a down-to-earth standpoint and not get tangled up in a lot of technical gobble-de-gook.

Let's go back and look at the first illustration. The basic parts are (1) a steel or iron core; (2) a primary coil and (3) a secondary coil.

The coils are *insulated* from each other and *insulated* from the iron core. There is *no* electrical connection between the coils or between the coils and the core.

Now, do you remember our discussion in the first article in this series (January, p. 58), when we told of the horseshoe magnet and how it would attract iron filings or carpet tacks? That power to attract those metal filings or carpet tacks is called *magnetism* and the pattern of attraction is called *lines of force*. It is that secret of magnetism that causes the transformer to *work*. The current flowing in from the primary side flows round and round that part of the iron core enveloped by the primary windings. When the current does that, it causes lines of magnetic force to be set up in the iron core. (A *magnetic* force, now, *not* electrical force, because there is no electrical connection between the coil and the core.) Those lines of magnetic force race round and round the iron core, and as they pass through that portion of the core enveloped by the secondary winding, they *induce* into the secondary winding an elec-



Sketch A | Sketch B | Sketch C | Sketch D

Most standard distribution transformers have two wires on the primary side, which can readily be identified by the smaller wires and heavier insulation; and four wires on the secondary side. This is especially true of the 2300 volt, 4000 volt transformers. The secondary side looks like sketch A.

The secondary leads can then be connected in several ways to produce several combinations of voltages. Assuming a 2300/230 volt transformer, we can get 230 volt 2-wire secondaries by connecting the leads as shown in sketch B (this shows the actual, external connections).

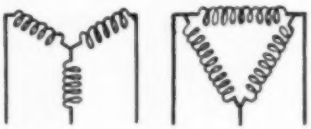
115/230 volt 3-wire secondary can be obtained by making the connection as shown in sketch C. 115 volt, 2 wire secondary can be obtained by connecting the leads as shown in sketch D.

trical current which then flows on out the secondary conductor. That's how the transformer works. And, without going into a lot of the reasons why, the relation between the primary and secondary voltages is *directly* proportional to the number of turns of the two coils. That is, if you have 2300 volts on the primary side and want 230 volts on the secondary side, the primary coil will have ten turns for every one of the secondary coil.

Such discussion is interesting, but to the man in the plant the chief concern is what and how his transformers may be employed. That is the primary object of this article.

Wye and Delta

But before we get into the details of employment of transformers, let's clear up a topic that many maintenance men I know have wondered about. That is the use of the expressions WYE (Y) and DELTA.



The expressions WYE and DELTA were derived from the schematic diagrams employed to denote such connections. A *wye connection* is diagramed at the left. Note that the figure looks very much like the English letter Y and that is where it gets its name.

A *delta connection* is diagramed at the right. Note that the figure looks like the Greek letter DELTA, which is printed △ and that is how it gets its name. Greek letters are often used in mathematics and engineering instead of English letters.

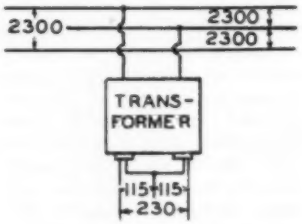
Well, there are four possible ways that single-phase transformers can be connected into three-phase banks. These are (1) delta-wye, (2) delta-delta, (3) wye-wye and (4) wye-delta.—Note the diagrams of a wye connection and a delta connection.

Most standard distribution transformers have two wires on the primary side, which can readily be identified by the smaller wires and

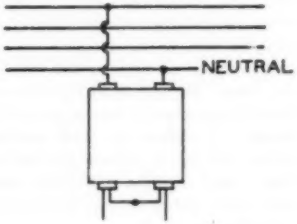
Suppose that in your plant the power is distributed at 2300 volts, 3-phase, 3-wire, and that you need to put up a 1-phase transformer for a lighting service. Connections would be made as shown in sketch E.

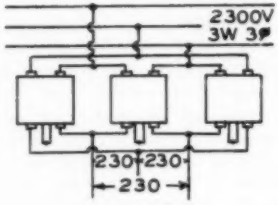
Some plants distribute electric power at 4000 volts, 3-phase, 4-wire. If a lighting service was desired from this primary, the single-phase lighting transformer would be connected as shown in sketch F.

Sketch E

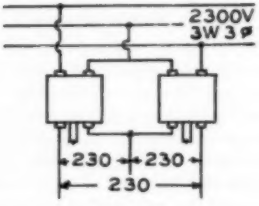


Sketch F





Sketch G



Sketch H

Suppose that your plant distributes the power at 2300 volts, 3-phase, 3-wire; and that at various load centers it is desired to step the voltage down to 230 volts 3-wire, 3-phase for service to the several motors at that point. External transformer connections would be made as shown in sketch G.

One of the most convenient connections of transformers is the arrangement known as *Open Delta*. This can be used when, in a delta bank, one of the transformers has to be cut out and/or removed for some reason. The external connection scheme for an open delta bank is shown in sketch H.

heavier insulation; and four wires on the secondary side. This is especially true of the 2300 volt, 4000 volt transformers. Secondary side is illustrated in sketch A. Sketches B, C, and D show several ways the leads can be connected to produce several combinations of voltages.

Sketches E, F, G, and H show various possible applications of transformers in the industrial plant. Note that sketch H shows the external connection scheme for an open delta bank. Strangely enough, when one of the transformers of a delta-connected bank is removed, and the bank operated in open delta, the capacity of the bank then becomes not 66 2/3 per cent of the total, as you might suppose, but only about 58 per cent. For example, if three 100 kva transformers are connected delta to provide a total capacity of 300 kva, then one of the transformers is removed and the other two operated open delta; the resultant capacity will not be 200 kva but only 0.58 x 300 = 174 kva.

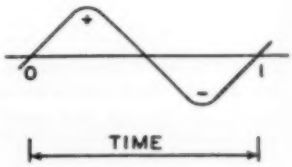
The reason that such a thing takes place is the *space* relationship of the phase and line currents.

Now we have stepped off into deep water that could well have been avoided. But since we have taken such a step we might as well go into the subject, for an explanation right here and now will not only assist us to a proper understanding of open delta transformer connections, but will be of great help in arriving at a clear understanding of the later articles on power factor and power distribution.

First of all we will have to enlarge our technical vocabulary by the addition of a few words.

When most of us think of numbers we picture in our minds 1, 2, 3, 4, 5, etc., which represent to us certain quantities. These ordinary, everyday numbers are what mathematicians call SCALAR quantities, (like a scale or a rule) and can be added to, or subtracted from, arithmetically—i.e., 1 + 1 = 2; 2 + 2 = 4; 3 + 1 = 4; etc.

The study of electricity and electric power would be greatly simplified if we could stick to these SCALAR quantities that can be handled by simple arithmetic. But, unfortunately, we can't; because we have to take into consideration the relationship in space, or time, that one quantity bears to another quantity when dealing with alternating currents. The reason we have to do this is because alternating voltages and currents do not move in a straight line, like direct current and voltages, but *wiggle around* in space like this:



That length of curve we see is called a cycle (one complete *twist* or *turn*). In most places in the United States alternating current is generated at 60 cycles—i.e., it makes 60 complete cycles per second.

Now, in order to properly interpret what such curves do outside of a straight line, that is, in space, mathematicians use another kind of numbers or quantities (in addition to the SCALAR quantities). These quantities or numbers are called VECTOR quantities or, simply, VECTORS.

Here is an example of the two quantities and also an example of how handy it is to have VECTORS.

First, let's take two 1-inch lines like this:

A————————B

C————————D

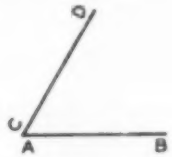
The first line runs one inch from A to B and the second one runs one inch from C to D. Now if we want to combine the two one-inch lines like this:

C

A————————B————————D

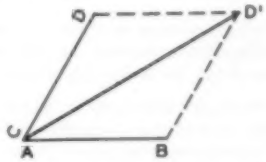
We all know, of course, that the combined length will be two inches. That is, one inch (A to B) plus one inch (C to D) results in two inches (A to D). The reason that we can add those two quantities arithmetically is that they both act in a straight line, or in the same plane.

Now let's take the same two lines and set them up like this:



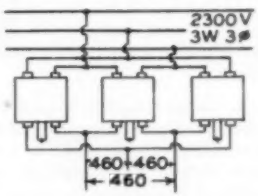
They are still each one inch long. But can you *add* them together? Yes, they can be added together, but only *vectorally*.

And here is how you *add* two lines vectorally:

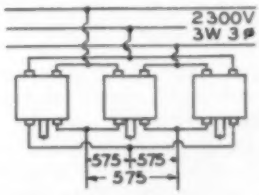


The line CD′ now is the resultant of A•B + C•D. (The little • denotes vectors). And, if you will measure CD′ you will find that it is

(*Continued on page* 96)



Sketch J



Sketch K

In many plants the motor voltage is 460 volts. Generally, transformers rated at 460 volts are also rated at 230 volts. If the distribution voltage is 2300, 3-phase, 3-wire, the 460 volt transformers would be connected as shown in sketch J.

Another secondary voltage that is widely used in industrial plants is 575 volts. Transformers for this secondary voltage usually have only one pair of secondary leads instead of the two pairs of 115/230 or 230/460 volt transformers. 2300 to 575 volt transformers would be connected as shown in sketch K.

Questions and Answers for Men in the Plant
HOW, WHY, WHEN, and WHERE

PART 4

WATER TREATMENT PROBLEMS AND SOLUTIONS

By A. T. LOHKAMP
Superintendent of Power Plant
Pasco Packing Co.
Dade City, Florida

This is the fourth of a series of "Q&A" articles designed to help plant men become more intimately acquainted with the equipment in their charge. A thorough understanding of the points covered, will improve operation and maintenance, and help employees advance to higher positions.

Q—What is the difference between ground, surface and meteoric waters?

A—Ground waters are those obtained from springs, shallow wells, and deep wells. Surface waters are those obtained from streams, lakes, ponds, and reservoirs. Meteoric waters are those obtained from rain, snow, ice, and sleet.

Q—If you have a water of low hardness, is softening required before using for boiler feedwater?

A—If the hardness is below 50 ppm no external treatment is required for feeding to low pressure boilers. If, however, the water is to be used in high pressure boilers, it should be softened and especially if economizers are used. Internal treatment will be required even on low pressure boilers. Treatment will vary according to amount of make-up water other than condensate.

Q—Can rain water or cistern water be used for boiler feedwater without softening?

A—Rain water is so-called soft water, but this is not true. As the rain falls, it will pick up impurities from contact with dust, soot, dirt, etc. It will absorb a lot of carbon dioxide and oxygen. Rain water may contain as much as 50 ppm of hardness. The general idea would be to proceed with softening or internal treatment as required by the boiler system.

Q—Is evaporated water or condensate good feedwater?

A—Condensate is excellent feedwater, but would require internal treatment to increase alkalinity and pH.

Q—If the water supply contained hydrogen sulfide and methane gas, how would you get rid of these impurities?

A—Hydrogen sulfide and methane gas could be driven out of the water by aeration. Degasifying towers are used for this purpose. These towers are built much the same as a cooling tower with forced draft. The absorption of oxygen by the water during aeration also assists in the removal of hydrogen sulfide by aiding in the oxidation of the hydrogen sulfide to form free sulphur. This free sulphur may have to be removed by filtration.

Q—What is meant by sedimentation?

A—Sedimentation means settling. Sedimentation tanks or basins are simply tanks or basins built to hold a quantity of water without movement to allow any suspended matter to settle to the bottom.

Q—What is aeration?

A—Aeration is the exposing of water in small droplets or thin films to free circulating air. The contact of water with the air will serve to oxidize some impurities and also to force gases out of solution in the water. Hydrogen sulfide, carbon dioxide, methane gas and similar gases can be removed from water by aeration.

Q—What is meant by deaeration?

A—Deaeration is similar to aeration in that the water is broken up into small droplets or thin films in the presence of heat to remove dissolved gases such as oxygen, carbon dioxide, ammonia, etc.

Q—What is meant by decanting?

A—To decant means to draw off the top.

Q—What is a swing pipe?

A—A swing pipe is a jointed pipe used to decant liquids off the top of a pool or tank. It is jointed so that the pipe can be lowered and raised without injuring the pipe or joints.

Q—What are ions, cations, and anions?

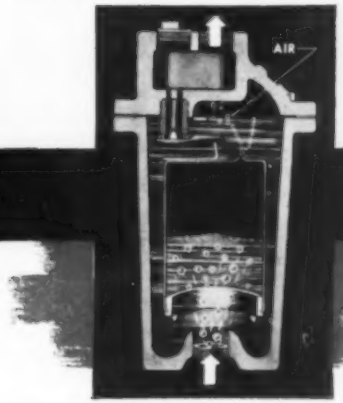
A—Ions are electrical charges. Cations are ions having a positive charge of electricity. Anions are ions having a negative charge of electricity.

Q—What is a continuous blowdown system? What are the advantages?

A—A continuous blowdown system consists of perforated pipe installed in the boiler drum and ex-

Armstrong traps vent air to give you hotter machines

HIGHER TEMPERATURES MEAN MORE OUTPUT



PSIG	Temp. of Steam with No Air Present	Temperature of Steam Mixed with Various Amounts of Air. (Per Cent Air by Volume)		
		10%	20%	30%
10.3	240.1	234.3	228.0	220.9
25.3	267.3	261.0	254.1	246.4
50.3	298.0	291.0	283.5	275.1
75.3	320.3	312.9	304.8	295.9
100.3	338.1	330.3	321.8	312.4

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ARMSTRONG STEAM TRAPS

Can slime and algae be controlled and why is it important in water conditioning?

Why must boilers be blown down?

What is meant by two stage softening?

What is aeration . . . deaeration . . . decanting?

Is water of zero hardness always good feedwater?

What causes red water and how can iron and iron compounds be removed from water?

Answers to these questions will be found in this discussion for the man-in-the-plant. Knowing the answers will help you advance to a higher position. It will also improve the operation and maintenance of your plant.

tending to the outside of the drum where it connects to piping leading to a throttling valve with which the amount of blowdown can be controlled. By using a continuous blowdown the alkalinity and total solids in the boiler water can be easily and closely controlled without the surging effect of intermittent blowdown. If a flash tank is used in conjunction with the continuous blowdown system, the flash steam can be used for feedwater heating which adds to the economy of operation.

Q—What is caustic metal embrittlement?

A—Caustic metal embrittlement or intercrystalline cracking generally occurs in boilers along riveted seams or tube ends. There are three factors necessary to produce intercrystalline cracking.

1. Leakage of the boiler water must take place so as to permit escape of steam and concentration of the boiler water at the point of leakage.

2. The boiler metal must be subjected to high stress. The stress may be either internal or external. Internal stresses result from cold working of the metal while external stress is the result of expansion or contraction.

3. The boiler water must possess embrittling characteristics and chemically attack the metal.

Leakage at the seams or around tube ends in a boiler will allow water in this confined area to concentrate until it may reach 75,000 to 50,000 ppm sodium hydroxide. In this range of concentration the water possesses embrittling characteristics.

Q—What is chlorination of a water supply?

A—Chlorination is a process in which chlorine gas or chlorine compounds such as hypochlorites are added to water or sewage.

Q—Why chlorinate water?

A—Chlorine is useful in the removal of certain objectionable tastes and odors from drinking water. The primary use of chlorine is to safeguard drinking water supplies by killing germs and disease producing bacteria. It is also used to oxidize iron, manganese, and hydrogen sulfide and by oxidizing these objectionable constituents, aid in their removal. Chlorine may aid coagulation, and destroy objectionable color and organic matter.

Q—What is meant by coagulation?

A—Coagulation means changing from a liquid state to a curd-like state by chemical reaction.

Q—What is meant by absorption, adsorption?

A—Absorption means that one chemical in uniting with another loses its original identity and the product of chemical reaction is not like either of the chemicals before reactions.

Adsorption simply means that one substance adheres or sticks to another in a very thin layer without losing its original identity.

Q—What is meant by filtration?

A—Filtration means the passing of a substance through a filter made to take out harmful or objectionable matter. In water conditioning, it means passing the water containing suspended matter through a filter bed built up of sand, gravel, coke, or treated coal to remove objectionable suspended material.

Q—What is slime?

A—Slime is a gelatinous mass resulting from the growth of micro-organisms and inorganic debris or waste. Slime may contain algae, fungi, and bacteria.

Q—What is algae, fungi, bacteria?

A—Algae are among the simplest form of plant life containing very few cells. Fungi are similar to algae, but consist of the molds, mildews, rusts, smuts, etc. Bacteria is a large group of typically one-celled micro-organisms many of which are disease producing, while many are active in processes such as fermentation, fixing of atmospheric nitrogen, converting dead organic matter into soluble food for plants.

Q—How can slime and algae be controlled and why is it important in water conditioning?

A—Slime and algae destruction is broadly classified as disinfection. In this sense disinfection means the destruction of all bacteria rather than only disease-producing bacteria. Chlorination is one method of destroying most micro-organisms. Enough chlorine must be supplied to the water to satisfy the demand of materials which are easily oxidized and those which absorb chlorine as well as providing a residual of .5 to 1 ppm in the water supply.

Chloramines can be used where it may be unnecessary to oxidize any matter in the water and only necessary to destroy bacteria. The chloramines are weak oxidizing agents, but retain their toxic properties in the destruction of micro-organisms. Copper sulfate is a widely used agicide. Potassium permanganate, phenolic compounds, mercury compounds can be used as bacteria destroying agents.

Slime and algae control is often essential in the treatment of waters for cooling systems, swimming pools, and municipal water

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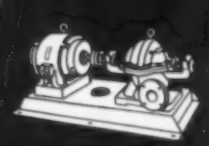
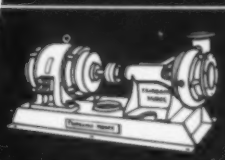


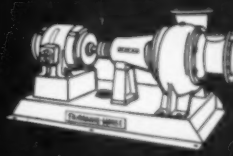
Two-Stage Centrifugal Pumps
Capacities: 100-560 G.P.M.

Builttogether
Centrifugal Pumps
Capacities: 5-1000 G.P.M.

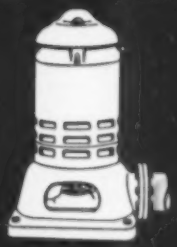


Base-Mounted Centrifugal Pumps
Capacities: 25-3000 G.P.M.

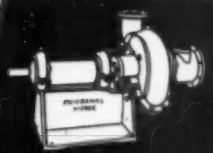
Frame Constructed
Rotary Pumps
Capacities: 1.3-450 G.P.M.



Horizontal Angle Flow Pumps
Capacities up to 100,000 G.P.M.



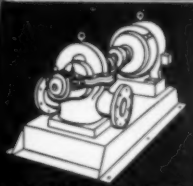
Deep Well Turbine Pumps
Capacities: 15-25,000 G.P.M.



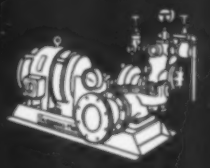
Paper Stock Pumps
Capacities up to
2500 G.P.M.

Rotary Pumps
With Geared Head Motor Drive
Capacities: 20-450 G.P.M.

Two-Stage Builtogether Pumps
Capacities: 5-1000 G.P.M.



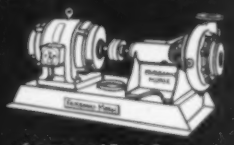
Split-Case Centrifugal Pumps
Capacities: 50-50,000 G.P.M.



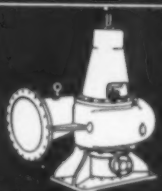
Centrifugal Fire Pumps
Capacities: 500-2000 G.P.M.

Bladeless Impeller
Food Handling Pumps

Vertical
Propeller Pumps
Capacities:
1250-216,000
G.P.M.



Sewage and Trash Pumps
Capacities: 50-20,000 G.P.M.



Vertical Angle Flow Pumps
Capacities up to
100,000 G.P.M.

supplies. If untreated, the water in a swimming pool may cause unsightly and unsanitary conditions due to scum on the surface of the water and on the sides and bottom of the pool. In cooling systems employing cooling towers, it is especially important to watch for algae and slime as they may clog pipe lines and hinder heat exchange. In process work such as paper manufacture, these microorganisms may clog screens, cause discoloration of the product, and poor quality product. In linen, cotton, woolen mills and dying industries, slime and algae may be very harmful and costly.

Q—Why must boilers be blown down?

A—Boilers must be blown down either intermittently or by continuous blowdown to control total solids and alkalinity. As water boils in the steam generator the steam passing out into the steam header possesses little or no solids, therefore, the solids concentrate in the boiler water. The same is true for alkalinity. If the steam generators or boilers were not blown down this concentration of alkalinity and solids would cause priming, foaming, or carryover and therefore must be controlled.

Q—If you saw a water report which stated that the hardness was 20 g.p.g. or 20 grains per gallon, what would be the hardness in parts per million?

A—To change any grains per gallon figure to parts per million, multiply the grains per gallon by 17.1 and the product will be in parts per million. g.p.g. x 17.1 equals ppm therefore, 20 g.p.g. x 17.1 equals 342 ppm hardness.

Q—What does it mean in water conditioning when we say that water contains 143 ppm hardness?

A—1 part per million of hardness means that there is .00834 pounds of impurities per 1000 gallons of water. Some of these impurities may be scale forming but not necessarily all of them since some non-scaling impurities will show as hardness. If there is .00834#/M gal then 143 x .00834 or 1.19262# of hardness per 1000 gal of water is present.

Pasco Packing Company's plant engineer discusses water treatment problems and solutions from the operator's point of view. Check the March issue for "Q&A" on water treatment terms and equipment.

Q—Is water of zero hardness always good feedwater?

A—Not always, since scale sometimes serves to protect metal and zero hardness water would deposit no scale. Rusting and corrosion of boiler metals may result from use of such water and alkalinity would have to be added in the boiler if the feedwater contained no alkalinity.

Q—What is meant by two-stage softening?

A—Two stage softening usually means first treating the raw water with a hot lime soda ash softener and then allowing the effluent to flow to a phosphate softener. The effluent from the phosphate softener will be low in hardness and have enough excess phosphate to protect the boiler. The effluent passes through the filters to the feedwater header.

Q—Why isn't sand or gravel used in filters following a hot-process softener?

A—The hot alkaline effluent from a hot process softener would pick up silica on the way through the filter bed. Silica is very harmful in boiler feedwater, because silica scale will cause localized overheating of boiler metals, tube burnouts, etc.

Q—Why is oil harmful to a boiler?

A—Even thin films of oil on the heating surfaces will greatly retard heat transfer. The resulting lack of rapid heat transfer may cause tube blistering, burnouts, and other attendant evils. The action of oil is unpredictable when in boiler water. Oil may combine with sludge in the boiler water and be plastered over the heating surface with the same results listed above or it may form small globs which will settle and cause overheating in small areas.

Q—How can oil be removed from water or condensate?

A—To remove oil from water direct filtration must be used. Filtration through loop sponges, burlap, terrycloth, coke, or excelsior can be used, but the screens or filters will not remove emulsified oil which is too finely divided. Emulsified oil must be removed by coagulation and filtration. First, chemicals are added to coagulate the oil and then the water and entrained floc is passed through filters to remove the coagulated oil.

Q—How can oil be removed from exhaust steam?

A—Oil can be removed from exhaust steam by baffle type oil separators from which condensate and oil mixture must be continuously removed. Some separators operate on the centrifugal principle similar to the cyclone separators of a B. & W. boiler.

Q—How can silica be removed from water?

A—Silica can be removed by hot process employing magnesium compounds such as magnesium oxide, magnesium sulfate (Epsom salts) magnesium carbonate, dolomitic lime (magnesium hydroxide) or calcined magnesite. A system for effective silica removal employing the above chemicals the temperature should be maintained close to 212 degrees F or above, have a pH of 10.1, use sludge recirculation, and enough storage must be provided for at least 15 minutes retention. Magnesium oxide is most efficient for silica removal and does not add to the dissolved solids. The other chemicals do add to dissolved solids in the water. Silica removal by anioncation exchange or demineralization is not effective.

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Q—What is meant by anion-cation exchange?

A—The anion-cation exchange system consists of a Zeolite softener of the sodium or acid types, which adsorb the cations or positive ions. The negative ions pass through unaffected. Anion exchange resins have been developed which are represented by the symbol R. The water passed through the cation exchanger then passes through the anion exchange resins and practically all minerals are removed and the effluent will be similar to distilled water. All the minerals will be removed with a few exceptions. Chief among the exceptions is silica as it will not be removed.

Q—What is meant by demineralization?

A—Demineralization is another name for anion-cation exchange.

Q—The effluent from anion-cation exchange process will have what characteristics?

A—The effluent will contain a trace to a few parts per million of sodium bicarbonate, sometimes a trace of chlorides and silica equal to that of the raw water.

Q—How can silica be removed by anion exchange?

A—In anion exchange, the weakly basic anion exchange resins will remove the strong acids such as sulphuric and hydrochloric, but will not remove weak acids such as carbonic and silicic acid. By adding fluorides such as sodium fluoride to react with the silica to form fluosilicic acid, which is a strong acid, the fluosilicic acid can be removed by the anion exchange resin and silica can be reduced to as low as from .1 to .5 ppm SiO_2 in the treated water. This method is usually used on waters having less than 10 ppm silica.

Q—What is the point of maximum density of water?

A—Water is at its greatest density at 39 degrees F.

Q—How many gallons in a cubic foot of water?

A—Cubic foot of water contains 7½ gallons.

Q—How much does a cubic foot of water weigh?

A—A cubic foot of water weighs 62.36 pounds when water is at 60 degrees F.

Q—To convert feet of head to pounds per square inch, what is the multiplier?

A—Multiply feet of head by .434 to change to pounds per square inch.

Q—How can you tell from a water analyses how much lime will be required to treat water?

A—Lime requirements are as follows:

A equals alkalinity as ppm $CACO_3$

Mg equals magnesium—hardness as ppm $CACO_3$

H equals total hardness as ppm $CaCO_3$

Then the number of pounds required per 1000 gallons of water will be equal to A + Mg ÷ 151. This is true for hydrated lime having 93% calcium hydroxide. If chemical lime is used, then the number of pounds required per 1000 gallons will be equal to A + Mg ÷ 193. Chemical lime should have a purity of 90% CaO.

Q—How can we figure the amount of soda ash (98% Na_2CO_3) required per 1000 gallons of water?

A—The amount of soda ash having a purity 98% sodium carbonate can be found by taking the hardness minus the alkalinity and divide by 111, then add the desired excess which is usually .25 pounds, or H − A ÷ 111 + .25 is equal to number of pounds per 1000 gallons of water treated.

Q—When is alum used in treating water?

A—Alum is added to water as a coagulant and with raw water supplies is most effective when the pH is in the range from 5.5 to 8. Alum is used with cold process treatment.

Q—What is meant by subsidence?

A—Subsidence is the process which permits the settling of suspended matter from water.

Q—How can mud, silt, or clay be removed from a raw water supply?

A—Mud, silt, or clay can be removed by subsidence, coagulation, or filtration or a combination of these.

Q—Can boiler water from the continuous blow-down system be recirculated to the hot-process softener?

A—Yes, this can be done, but it is advisable only after careful study. Sometimes it pays and sometimes it does not.

Q—How does water absorb CO_2 and what effect does it have on the final constituents of the water?

A—Water, even pure water, is a good solvent. When rain, snow, or sleet falls, it absorbs CO_2 out of the air along with some mineral impurity. Water analyses may show high bicarbonate contents and this is made possible by the fact that the CO_2 absorbed by the water makes the water a better solvent so that limestone, chalk, dolomite, and magnesite may be 100 times as soluble in water containing CO_2 as it is in water that doesn't contain CO_2. The solvent properties of the water depend upon the amount of CO_2 in the water. Rain, sleet, snow or surface water in thin films can absorb only about 2 ppm of CO_2 from the air, but additional CO_2 is absorbed as the water seeps into the ground or is in contact with decayed vegetable matter. CO_2 can also be picked up from certain strata underground and especially if it contacts decayed vegetable matter of any kind.

Q—What is the maximum safe operating temperature of boiler steel?

A—About 900 F is usually considered the maximum safe operating temperature for boiler steel. Since scale in the water side of a tube has about the same insulating qualities as fire-brick, it is easy to see why bagging of tubes and tube rupture can easily occur. The fire in a boiler firebox may range from 2300 F to 2600 F. If scale retards the heat transfer, tubes can easily exceed 1200 F, which would probably cause tube bagging and possible rupture.

Q—What is the determining fac-

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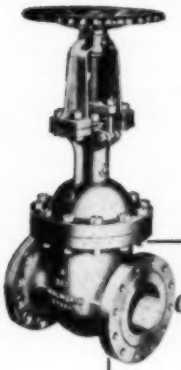
Wedge Gate — Outside Screw and Yoke



Sectional view of Series 300

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tor when checking phosphates for strength or power to soften water?

A—The determining factor for strength of a phosphate is the P_2O_5 content or the phosphorous pentoxide content.

Q—What is the Langelier Index?

A—The Langelier Index is useful in predicting whether water at one temperature will be scale forming or corrosive if raised to another temperature. Solving for the index involves knowing and using the M.O. alk., the calcium hardness, the total solids, the pH value and the temperature to which the water will be raised. The pH is also calculated. Calculated pH; pHs is equal to 9.3 plus total solids plus temperature minus calcium hardness minus M.O. alk. The Langelier Index then becomes actual pH minus calculated pH. If the index equals O, water is neutral (neither scaling or corrosive). If index is plus quantity, the water will have a tendency to form scale at the new temperature. If the index is negative quantity, the water has a tendency to be corrosive at the new temperature.

Q—What causes red water? How can iron and iron compounds be removed from water?

A—Red water is usually caused by either the corrosive action of water containing dissolved oxygen, or it may be caused by hydrated ferric oxide. Ferrous bicarbonate can be removed by aeration and filtration, base exchange; suspended ferric hydroxide by manganese zeolite filtration; organic or colloidal iron by coagulation and filtration; and ferrous sulfate by neutralization, aeration and filtration.

Q—What is meant by Specific Conductance?

A—Specific Conductance of a water is a measure of the ability of the water to conduct an electric current. Pure water offers a high resistance to the passage of an electric current, but if ions are present, it becomes less resistant to the flow of an electric current. The greater the number of ions, the less is the resistance and the greater is the conductance. Many inorganic compounds such as sodium chloride and sodium sulfate in solution dissociate into negative and positive ions. This dissociation of compounds into ions makes possible the measurement of the conductance.

Q—What is a Conducto Bridge?

A—The Conducto Bridge is an instrument, which affords a rapid means of checking conductance.

Q—Does conductance measure total solids?

A—Conductance measures only dissolved solids and will not measure non-electrolytic solids such as organic matter and most suspended solids.

Q—What is the ratio of conductance in micromhos and dissolved solids in boiler water in ppm?

A—The exact relationship between dissolved solids in boiler water and specific conductance in micromhos depends upon the characteristics of each particular boiler water and must be calculated for each water. An average ratio determined over a wide range of operating conditions is 1 micromho equals .9 ppm dissolved solids, when the sample has been neutralized with Gallic acid.

Q—What is a micromho?

A—A micromho is one millionth of a mho. Since conductance is the reciprocal of resistance and the unit of resistance is the ohm, the term, mho (ohm spelled backwards) was chosen to represent the basic unit of conductance.

Q—What is the ratio of micromhos to ppm dissolved solids when measuring steam purity by means of condensed steam samples?

A—In condensed steam samples, one micromho is equivalent to .5 or .6 ppm dissolved solids. This factor is subject to slight variation depending upon the individual steam condensate and the specific ions contributing to the impurities.

Q—What are some of the limitations of the conductance method of measuring steam purity?

A—Unfortunately dissolved gasses may have a marked effect on the conductance of condensed steam. Gasses such as ammonia, carbon dioxide, hydrogen sulfide, etc., ionize in water solution and will add to the conductance. Ammonia, if present, may cause a high conductance since this gas may average 8 or 9 micromhos per part per million. Free carbon dioxide will also increase the conductance of the steam sample. Sometimes this increase is equal to approximately ½ that of the average boiler water solid.

Q—How can corrections be made for dissolved gasses present in the steam?

A—Correction can be made by referring to a prepared chart and subtracting the conductance due to each gas from the total conductance. The exact amount of each gas present must be determined by analysis. If a continuous record of the conductance is to be made, a Straub degassing condenser may be used. This method is especially good if the gas content of the steam varies frequently.

Q—Is specific conductance a good method for controlling the amount of boiler blow-down?

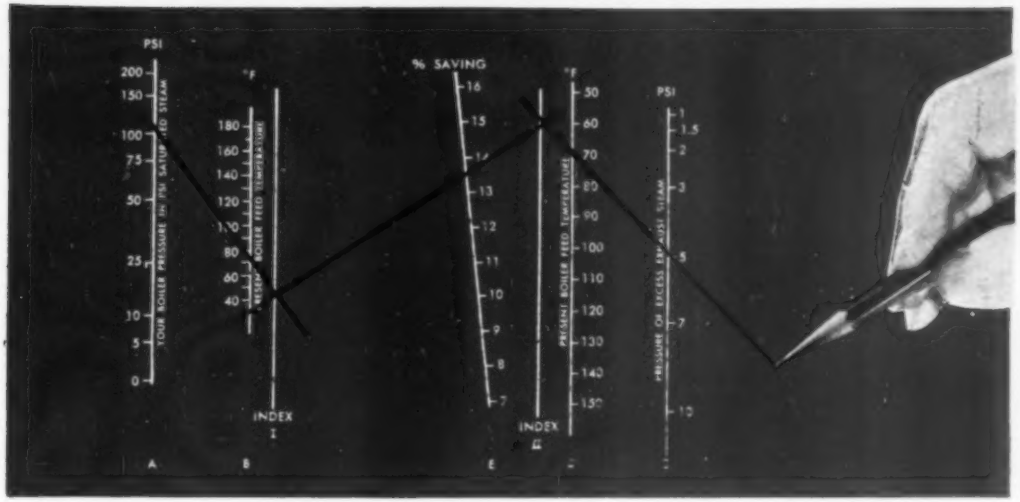
A—Yes, it is excellent. From a series of checks on the boiler feedwater, the amount of suspended solids can be determined. An average of these amounts multiplied by the cycles of concentration will usually give a close average of suspended solids in the boiler water. By knowing the amount of total solids to be tolerated in the boiler, the portion due to dissolved solids can be figured and a maximum conductance set up for control purposes.

Q—What is meant by potable water?

A—Potable water means water that is suitable for human consumption as drinking water.

Q—What are the maximum limits for impurities other than bacteria allowed by the "Public Health Service and Manual of Recommended Water Sanitation Practice"?

Use exhaust steam and cut fuel costs with a Swartwout Feed Water Heater

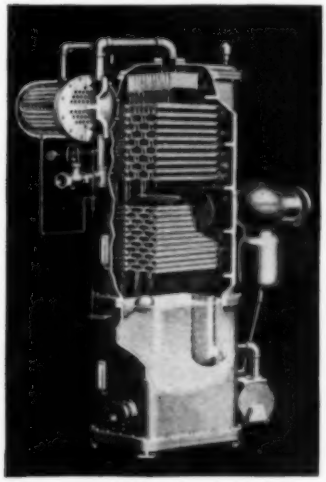


1 **UTILIZING RESIDUAL HEAT** in exhaust steam, you effect a direct saving in fuel costs of approximately 1% for each 11°F increase in boiler feed water temperature. Furthermore, you improve boiler operation in other important, cost-cutting ways. Faster steaming rate . . . removal of the soluble gases that cause costly corrosion in boiler and economizer . . . reduction of temperature strains.

Here's how to figure your fuel savings. Connect point on A to point on B; project line to intersect Index I. Connect points on C and D; project line to intersect Index II. Connect points on I and II and read your fuel savings on Scale E. The example given (100 psi saturated steam boiler using 70°F feed water and 5 psi exhaust steam) shows a *saving of approximately 13.6% of your present fuel cost.* A-6063

Swartwout

POWER PLANT EQUIPMENT
PROCESS INDUSTRY CONTROLS
INDUSTRIAL VENTILATION

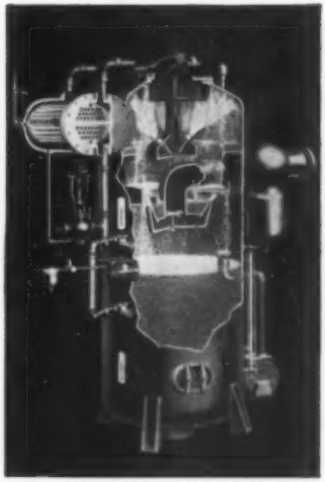


2

SWARTWOUT TRAY TYPE HEATERS, by using counterflow principle, give greatest degree of deaeration because water is in contact with clean steam just before dropping into storage section. Swartwout cast iron or steel deaerating heaters (.03 oxygen guarantee) and deaerators (.005 oxygen guarantee) can be supplied with cast iron or stainless steel trays.

3

SWARTWOUT SPRAY TYPE (atomizing) deaerators are of all-steel construction, give feed water with oxygen content guaranteed not to exceed .005 cc per liter of water. All surfaces which are subjected to impingement of water are made of corrosion-resistant stainless steel. Swartwout feed water heaters are specially designed to meet your individual requirements and range from 5000 to 300,000 lb. capacities.



SEND FOR BULLETINS S-18-E, S-210 • THE SWARTWOUT COMPANY, 18511 EUCLID AVENUE, CLEVELAND 12, OHIO

A—The maximum amounts of various chemical substances in addition to being free of odor and color are:

1. Turbidity not over 10 ppm.
2. Color not over 20 on Standard Cobalt scale.
3. No objectionable taste or odor.
4. Lead, not over 1.0 ppm by weight.
5. Arsenic, not over 0.05 ppm by weight.
6. Salts of Banium, hexavalent chromium, heavy metal glucosides or other substances with deleterious physiological effects shall not be allowed in the water supply system.
7. Copper (Cu) not over 3. ppm
8. Iron (Fe) and Manganese (Mn) together not over 3 ppm.
9. Magnesium (Mg) should not exceed 125 ppm.
10. Zinc (Zn) not over 125 ppm.
11. Chloride (cl) not over 250 ppm.
12. Sulfate (SO_4) not over 250 ppm.
13. Phenolic compounds not over .001 ppm in terms of phenol.
14. Total solids should not exceed 500 ppm for water of good chemical quality. However, if water of this quality is not available, a total solids content of 1000 ppm may be permitted.

Q—If a water contains more than 250 ppm of sulfates or chlorides, is it unfit for drinking water?

A—Not necessarily; the book of standards specifically states that chlorides or sulfates should preferably not exceed 250 ppm if more suitable supplies are available. If no more suitable supply is available, then it can be used even though chlorides or sulfates exceed the limit. Quite a few municipal supplies contain in excess of the limit.

Q—If water for municipal supplies is softened with lime and soda ash, what should the total alkalinity be? If chemically treated?

A—If lime-soda softened, the total alkalinity should not exceed the hardness by more than 35 ppm. If chemically treated, the phenolphthalein alkalinity as $CaCO_3$ should not be greater than 15 ppm plus .4 the total alkalinity. This limits the permissible pH to about 10.6 at 25 degrees C.

Power and Lighting Transformers

(*starts page* 83)

only 1¾ in. long, not 2 in. long.

The vector sum of line AB and line CD depends not only on the linear values of AB and CD but also on the value of the angle at which they are set one unto the other.

Now, with that brief background of the relationship of quantities in space, and how two lines, each one inch long, when added together do not necessarily result in a line two inches long, suffice it to say that, because of the *space* relationships of the phase currents and line currents of a delta-connected bank, when one of the three transformers is removed the resultant capacity is not 66 2/3 per cent, but only 57.8 per cent.

It is important to remember that, while an open delta bank is a very handy scheme, its capacity is only 57.8 per cent of the original closed delta bank.

Natural Gas Firing and Control for Boilers

(*starts page* 80)

½ in. is provided between box and mounting panel. Ambient temperature surrounding the relay should not exceed 115 F, and some form of shield shall be provided to prevent radiant heat from hot boiler surfaces reaching the relay.

Induced Draft

If the boilers are to be operated on induced draft, with fan and in a single or common breeching, a slight modification to the control system will be necessary.

A breeching damper, with locking quadrant, must be installed. It will be fully opened on the purging period and partially closed and locked on the operating cycle. With low pressure burners, constant draft must be maintained in the center of the firebox above burners and this is secured by positioning the breeching damper.

To insure full operational safety, a definite purging period of 15 seconds minimum shall be established. This will meet the full requirements of Underwriters, Factory Mutual, and be in accord with American Standard Requirements of American Gas Association ASA —Z21.33—1950.

This can be done by establishing a time delay relay in the Protectorelay Circuit, with interval control served by a Drysys Suction-Type Air Flow Switch to control the purging period. A spring return motor opens air-shutter to the burners admitting purging air. The induced draft fan is running during this time and breeching damper is in full open position. This shutter provides fresh air to the boiler and prevents overload of fan motor on cold air starting.

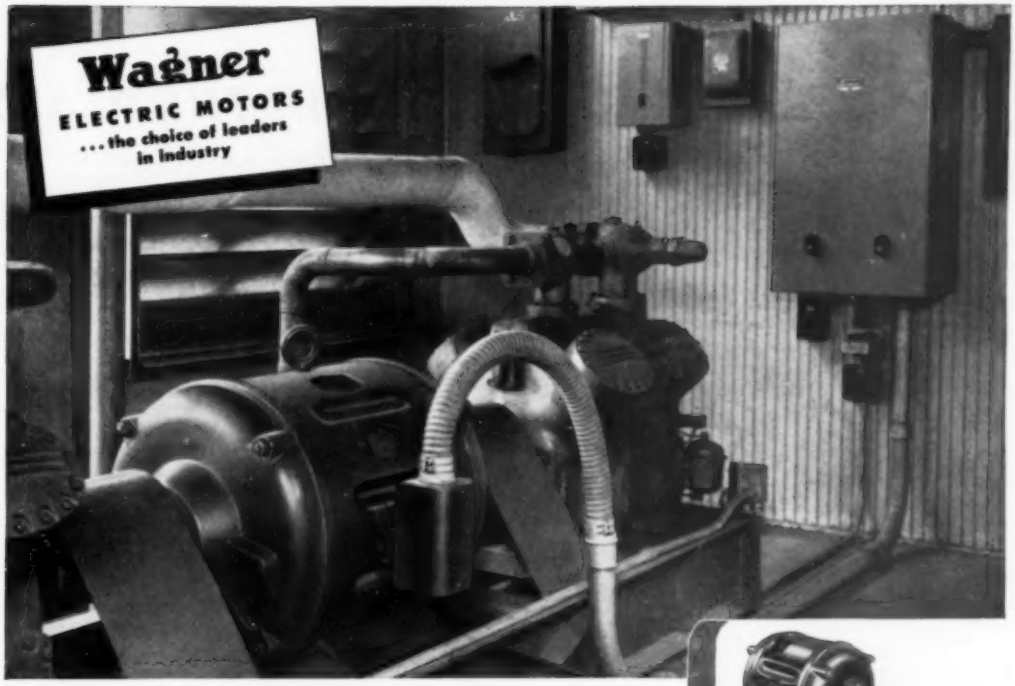
After the purging interval, spring return motor returns to its original position and closes air shutter. Protectorelay cycle starts immediately and energizes load relay, providing gas flow to pilot solenoid and to the pilot.

In this manner, firebox explosions are prevented by purging the entire boiler of any gas which might have leaked in during the shut-down period.

General arrangement of burners and piping for firebox type boilers is shown in Fig. 1. Pilot details are shown in Fig. 2, and the arrangement for adjustment of louvre is shown in Fig. 3.

Note:

Specification and details courtesy A. P. Woody Engineering Company, Gulfport, Miss.



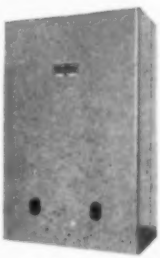
Investigate the many advantages of using

the Wagner Part-Winding Increment Motor and Starter Combination

The Wagner part-winding increment motor and starter combination provides an economical method of starting polyphase squirrel-cage motors when reduced current draw at start is required. No auto-transformers or resistors are necessary.

Wagner polyphase motors for part-winding starting, both normal and high torque, are wound with two circuits in parallel. The magnetic type increment starter has two magnetic contactors. When the first contactor closes, the line is connected to one group of the motor windings and a pneumatic timer is started. After the desired time interval, the pneumatic timer closes the second magnetic contactor which connects the line to the other part of the motor winding. Using this motor and starter combination, the current drawn from the line is about 60 percent of the normal locked current of the motor. It has the advantage that the current taken from the line is not broken during the starting period, as is the case when auto-transformers or compensator-type starters are used.

Motors with manual type starters are also available.



This magnetic part-winding increment starter can be furnished in combination with any of these Wagner Motors.

Open General Purpose Motor. Normal or High Torque.

Explosion-Proof Motor. Normal or High Torque.

Totally-Enclosed Fan-Cooled Motor. Normal or High Torque.

Splash-Proof Motor. Normal or High Torque.

WAGNER ELECTRIC CORPORATION
6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

® Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

M49-9

HELPING the *MAN-IN-THE-PLANT*

ideas . . . tools . . . methods . . . devices

Fire Hazard Reduced By Steam Snuffer

DUE to frequent electrical storms in our area, we are troubled by lightning striking the relief valves on top of the various towers —causing the valve to leak and igniting the escaping gas. It was necessary for an operator to climb the tower and put the fire out with a steam hose, a dangerous and unpleasant task in stormy weather.

To reduce the hazard, a ⅜-in. pipe line was installed to conduct steam to the top of the tower and into the discharge line of the relief valve. The steam line parallels the ladder to the top of the tower and then ells over and up into the discharge line of the relief valve. The steam snuffer is made of one ⅜ x 8-in. nipple perforated. The nipple is welded into the discharge line of relief valve and extends about five inches into discharge line. A ¼-in. drain hole is drilled into the bottom of the discharge line and permits steam condensate and moisture to drain from line.

When a relief valve is struck by lightning and the leaking gas ignited, the operator opens the ⅜-in. valve on the steam line to the relief valve and the steam snuffs out the fire. This system was installed on all towers in the plant. Fires are put out quicker and safer by this method.—*H. L. Baber, chief operator, Gregg-Tex Gasoline Corporation, Longview, Texas.*

Data courtesy Wm. F. Lowe, Secretary, Natural Gasoline Association of America, Tulsa, Oklahoma.

Drilling and Reaming

A SIMPLE drill block designed by *Loyd D. Cain*, now an assistant foreman at *Texas Engineering and Manufacturing Company, Inc.*, Dallas, Texas, is saving approximately three manhours per unit on Boeing B-47 rear fuselage sections being manufactured by TEMCO.

Cain's suggestion, submitted through the TEMCO suggestion system, was designed to simplify the drilling and reaming of holes for the bolts used to attach the fin stub chord angles to the main fuselage forging. When this operation was done without a fixture, it was difficult to keep the holes straight or make the bolt heads seat properly, and considerable rework was required. The new block which serves as a drill jig on one end for drilling 5/32 in. holes, and as a fixture on the other end for reaming these holes to ½ in., has eliminated this rework completely.

Cain's device is typical of the many suggestions which are being turned in daily by TEMCO employes to help reduce manhours and do the job more efficiently. Awards for suggestions are given only to non-supervisory employes.

NO MORE SLUDGE

"Make-Up Oil Cut 19%"

— says Deltox Rug Co., Oshkosh, Wis.

MAKING A CHECK. Sinclair Rubilene shows complete separation from water.

Fine, smartly-designed fibre rugs made by the Deltox Rug Company are favorites with budget-wise consumers from coast to coast. The Deltox plant, in Oshkosh, Wis., generates its power with an Ames 4-cyl. Uniflow Steam Engine, shown here.

At first, this engine was giving Deltox engineers trouble with sludging and oil emulsification in the circulating system. Then, about a year ago, Deltox changed to Sinclair RUBILENE® Oil Medium. The gauge glass was watched vigilantly, but there was no evidence of emulsification or developing sludge.

Besides ending emulsification and sludging, the subsequent yearly overhaul showed practically no valve cam or bearing wear; and carbon deposits in the valve gearing were negligible. Furthermore, a check of past records showed a cut of 19% in make-up oil.

Are you getting full satisfaction from the circulating systems in your plant? Perhaps a Sinclair Engineer can save you maintenance and operating expense. Get in touch with your nearest Sinclair Representative, or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR OILS for circulating systems

Sealing Device for Spray Header Piping

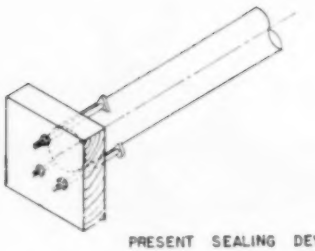
CONVENTIONAL sealing devices for the end of spray header piping are screwed caps or wooden blocks bolted to lugs affixed to the spray header.

To facilitate spray header cleaning and to permit the job to be done quickly and economically, we devised the illustrated sealing device.

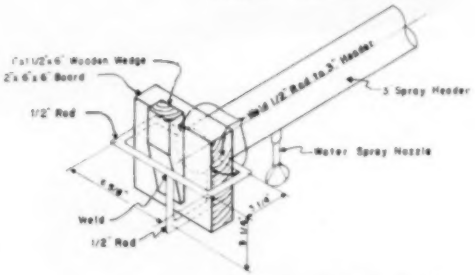
It consists of a basket receptacle fabricated from ½ in. rod. Receptacle is welded to the end of the pipe and is of sufficient size to contain a square 2 in. thick wooden block of proper diameter to cover the open end of the spray pipe. Block is to fit loosely enough in the container to permit a wooden wedge to be inserted between the block and the ½ in. rod at the face of the block.

A sharp tap on the wedge forces the block against the pipe opening to permit a near water-tight seal. To remove the block, the wedge is knocked out and the loose block lifted out of the housing by hand.

As there are no metal parts in the device design, corrosion is no problem. The only tool required is a hammer, etc., to insert or remove the seal.—*Jim Barton, Maintenance Superintendent, Phillips Petroleum Company, Phillips, Texas.*



PRESENT SEALING DEVICE



SUGGESTED IMPROVED SEALING DEVICE

Shop Made Portable Crane Speeds Engine Maintenance

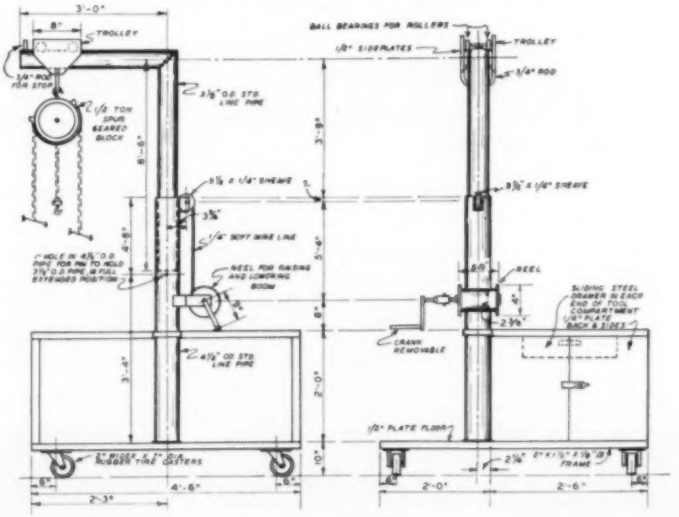
THE illustrated combination tool wagon, work bench and portable crane has proved to be a very efficient labor saving device for removing cylinder heads, cylinders and pistons from generating engines such as the Ingersoll-Rand PVG 6 and 8 cylinder types. It is particularly applicable where such units are situated side by side so that an overhead traveling crane cannot be easily used.

Any good shop welder can build this unit in about 20 hours and it will pay for itself on the first overhaul job.

Operation

The boom lowers to permit passage under piping and other obstructions, and raises to lift engine parts with sufficient clearance. Parts can be swung as much as 180 degrees or more and lowered to the floor for cleaning and repairing. Unit can be rolled easily by two men. Maintenance men can stand on the top deck to perform dismantling and re-assembling operations. A large tool compartment with sliding drawers in each end, is adequate for all tools required for the job. *G. I. Harkrader, Skelly Oil Co., Skellytown, Texas.*

Combination tool wagon, work bench and portable crane.



This helping the man-in-the-plant item was submitted as an Operating Kink entry in the Amarillo, Texas Panhandle-Plains Regional Meeting of the *Natural Gasoline Association of America* and is published through the courtesy of the association's secretary, *William F. Lowe*, Tulsa, Oklahoma.

NEW

Fiberglas Plant Installs Horton Tank for Fire Protection

An outstanding characteristic of fibrous glass is its non-combustibility. Even a blow torch won't make it burn!

But what about the plants that produce fibrous glass . . . are they as equally fireproof as their products? Can fire destroy their buildings, equipment and records? The answer is an unqualified YES . . . ***unless adequate fire protection equipment is provided.***

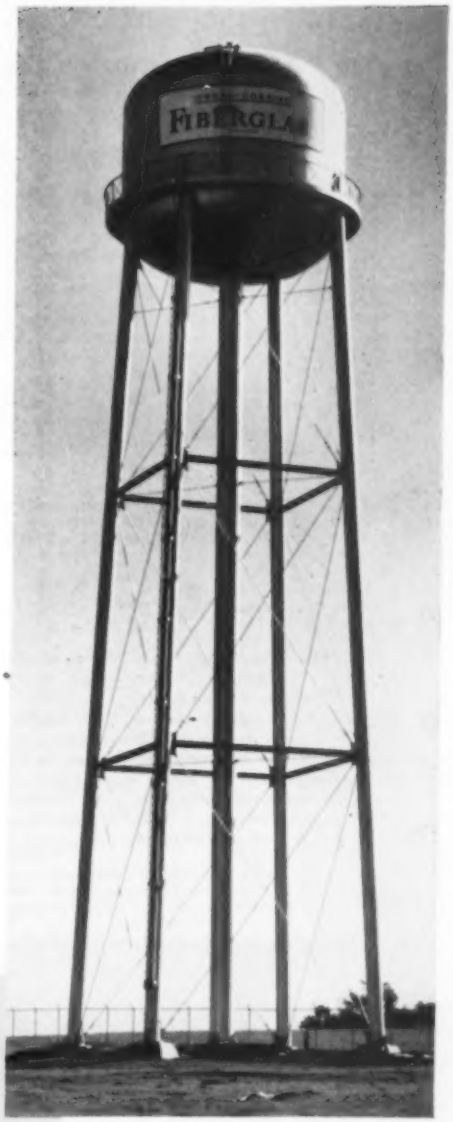
That's why Owens-Corning Fiberglas Corporation—the world's largest producer of fibrous glass—installed an automatic sprinkler system and a Horton elevated water tank at their new Anderson, South Carolina, plant. This dependable combination will quench a fire the instant it starts. Action is completely automatic—24 hours a day!

Horton elevated tanks provide a dependable supply of water for fire protection because they operate by gravity pressure. Pumping isn't necessary . . . except to refill.

Horton elevated water tanks with ellipsoidal-bottoms are built in standard capacities from 15,000 to 500,000 gallons. Tanks with radial-cone bottoms are built in standard capacities from 500,000 to 3,000,000 gallons.

When requesting estimates, please state capacity, height to bottom, location and type of insurance carried.

From each glass marble this size, the Fiberglas plant at Anderson, South Carolina draws a filament *95 miles long.* These filaments go into the Fiberglas yarn used for plastic reinforcement, electrical insulation, curtains, baling twine, mechanical rubber products and scores of other consumer and industrial products. Fibrous glass is extremely flexible, yet it has the tensile strength of about 230,000 lbs. per sq. in.



100,000-gal. Horton elevated water tank, 100 feet to bottom built for the Owens-Corning Fiberglas Corporation at Anderson, S. C., by Chicago Bridge & Iron Company.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1531 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Guildhall Bldg.
Detroit 26.....1534 Lafayette Bldg.
Houston 2.....2132 C & I Life Bldg.
Havana.....402 Abreu Bldg.
Los Angeles 17...1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3.....1646—1700 Walnut St. Bldg.
San Francisco 4.....1521—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.
Washington 6, D. C.....1114 Cafritz Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA. In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

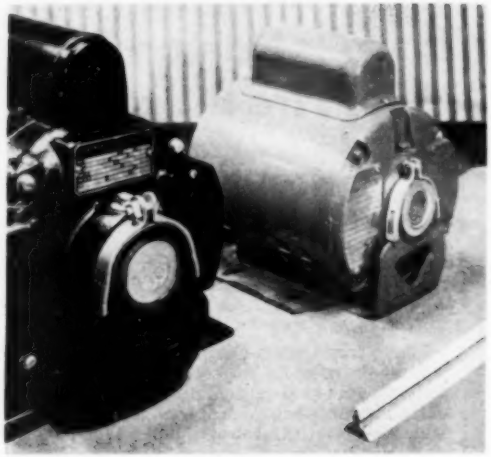
NEW EQUIPMENT for Southern Industry

New FPH Motor Design

Improved appearance, smaller size, increased versatility, and lighter weight are featured in the new line of fractional horsepower motors announced by General Electric. According to G-E engineers, the Form G motor weighs as much as 51 per cent less per horsepower than the models it replaces, and is considerably smaller in size.

One of the new G-E open dripproof Form G fractional horsepower motors (right) is dwarfed by one of the company's former Form B motors of the same rating. In this ½ hp size, the older motor is approximately 92 per cent heavier than the new Form G.

Motors are available in open dripproof and totally enclosed fan-cooled models in Types K (polyphase), KC (capacitor start), KH (split phase), and KCP (permanent split capacitor).



E-1 GENERAL ELECTRIC COMPANY, Schenectady 5, New York, has announced a new line of fractional horsepower motors embodying an entirely new concept of motor design. The new motors are designated as Form G.

The various models available have hundreds of applications—on pumps, fans, blowers, compressors, motorized tools of all sorts, etc. The advance design incorporates a completely new insulation system consisting of a special nylon material combined with Formex wire and Glyptal varnish to give the motors longer life.

Being smaller and lighter, the Form G permits installation of maximum power in minimum space. Its use also decreases transportation and storage costs on motors and motorized devices, makes handling easier in factories and warehouses, and eliminates the need for heavy mounts on machines.

Open dripproof models are as much as 48 per cent lighter than previous motors of equivalent rating, while the totally enclosed fan cooled types weigh less than half as much in some cases.

With the improved bearings, lubrication, and insulation, the Form G general purpose sleeve-bearing motor offers a wider range of application, and will eliminate, in many instances, the extra expense of special enclosures or ball bearings. It is the only motor of its type recommended for all-angle operation.

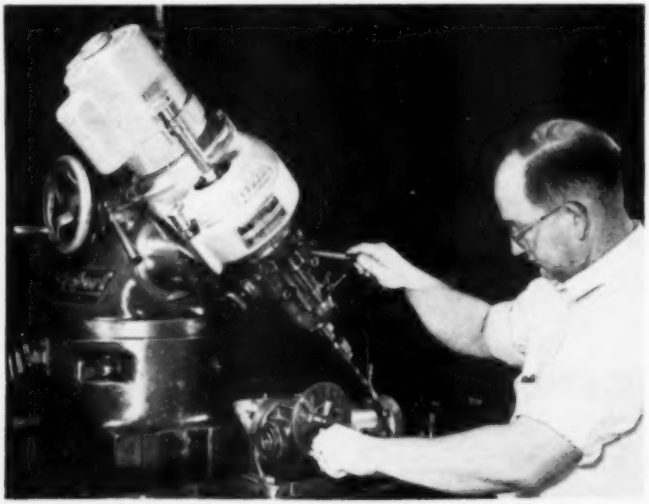
The motors conforming fully to all NEMA specifications, will be offered in a complete range of standard horsepowers, speeds, voltages, and frequencies.

For additional information in this new fractional horsepower motor design, circle item code number E-1 on the postage free service coupon post card on page 17. G.E. Catalog GEA-5567 features design and operating data on the following designs:

Type KC—Capacitor start: for domestic water pumping, air conditioning compressors, motorized tools where starting torque under heavily loaded conditions is required.

Type K—Polyphase: for pumps, compressors, fans, blowers, and other industrial equipment where constant

Here is the new G-E totally-enclosed, fan-cooled, ½ hp, Form G motor shaft-mounted on a machine tool. The motor may be rotated in any position and still retain its protective feature of keeping out dust, dirt, and other foreign matter.



TNEMEC PRIMERS KILL RUST!

SMALL amounts of moisture will inevitably penetrate any paint film, causing rust and corrosion . . . but TNEMEC *uses* this moisture to destroy rust at its source!

TNEMEC PIGMENT is a compound which includes and intensifies the preservative properties of Portland cement. Combined with moisture, it creates a neutral condition on steel surfaces, changing active rust and corrosive agents into an inactive neutral compound.

That's the amazingly simple process that makes TNEMEC so outstandingly successful as a prime coat on steel. We invite you to investigate the performance of TNEMEC Primers on any type of installation . . . for adhesion, waterproofness and durability . . . under the most severe conditions. Its record as a long-lasting, anti-corrosive coating is unique.

Ask Any TNEMEC User
(TEE-NEE-MIK)

MAIL THIS COUPON FOR YOUR COPY OF TNEMEC CATALOG 50

SEE OUR CATALOG IN SWEET'S

TNEMEC COMPANY, INC.

TNEMEC COMPANY, INC.
131 W. 23rd Ave., North Kansas City, Missouri

Gentlemen:
Send my copy of your Catalog 50 to:

NAME _____

FIRM NAME _____

ADDRESS _____

CITY _____ ZONE ___ STATE _____

Which one counts most?

Of all the 2708 men and women who make up Bell & Zoller Coal Company, *no single individual is most important!* Just as in any other business, coal production takes a lot of people doing a lot of different things to keep the ball rolling. And it takes teamwork too. Serving the folks who buy Bell & Zoller coals is a job in which each miner, driller, loader, clerk, salesman and executive plays a vital part. Every one of them—and their families, too—have an important stake in how well the job is done.

Ours isn't exactly a huge organization, nor is it a small one, by any means. But man for man and woman for woman, we don't know of one *anywhere* that does a better job of working together to see that every customer gets the utmost of service and satisfaction.

COAL HEATING SERVICE

BELL & ZOLLER COAL COMPANY

BELL BUILDING, CHICAGO 1, ILLINOIS

ST. LOUIS • NASHVILLE • OMAHA • MINNEAPOLIS

Sixty-Five Years of Service to Coal Users

Producers of
ZEIGLER, MOSS HILL, ORIOLE, MURDOCK, JEFFCO, BUCKHORN AND MOUNT OLIVE Coals

Sales Agents for
Mulberry Hill Coal Company
Freeburg, Illinois

Otter-Eagle Coal Company
Lockwood, West Virginia

Boone County Coal Corporation
Sharples, West Virginia

speed is required, and two or three-phase power is used.

Type KCP—Permanent split capacitor: for shaft-mounted fans and blowers where quiet, multi-speed operation under constant load is desired.

Type KH—Split phase: for fans, blowers, centrifugal pumps, office appliances, and other general uses where moderate starting torque and quiet smooth performance are needed.

Flexible Protected Multi-Tube Control Circuit Cable

E-2 BAILEY METER COMPANY, 1050 Ivanhoe Road, Cleveland 10, Ohio, has announced that pneumatic and hydraulic control circuits may now be streamlined through the use of patented *Armortube* Cable, a flexible, protected multi-tube transmission line.

Bailey Meter Company's Armortube Cable, showing 4, 8, and 12 tube types with connecting fittings. Cable is designed to cut installation time and costs, save critical materials, protect instrument and control connecting lines, conserve space, and improve plant appearance.

This unique cable is made up of ¼ in. O.D. aluminum or copper tubing gathered in a slow continuous spiral similar to the construction of rope. A tube bundle is first wrapped in water-repellent insulating tape; then encased in heavy rust-resistant, galvanized steel strip like that used for BX electrical cable.

Armortube cable is capable of transmitting hydraulic control pressures as high as 3000 psig and all ranges of pneumatic control pressures. Connections and take-offs may

TYPE 1 TYPE 1A

Single or double fan installations with automatic controls. Double operates on single furnace, or serves two. On single furnace either fan can operate up to 70 percent capacity; other fan then cuts in automatically.

TYPE 2

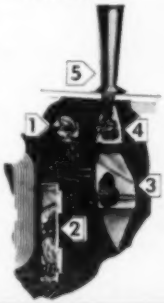
TYPE 2A

TYPE 3

You eliminate fluctuations or losses in draft efficiency by the use of Prat-Daniel Stacks. P-D Fan Stacks coordinate the relationship of fans, breeching and stacks to provide and maintain maximum efficiency.

Thousands of P-D Fan Stacks in long operation have proved their superior reliability over induced-draft fans and stacks purchased separately. Easily applied to any installation, they provide highly efficient draft for the load conditions of your power plant.

Our project engineers provide expert assistance on any problems of draft production and control. Call them on current problems or planned installations. Write for Catalog No. 200.



UNIT RESPONSIBILITY

Prat-Daniel, through its sales and project engineers, The Thermix Corp., offer a complete complement for handling the air gas stream shown at left; 1. Forced Draft Fans, 2. Air Pre-heaters, 3. Tubular Dust Collectors, 4. Induced Draft Fans and 5. Fan Stacks. This unit responsibility, by a well-known firm, relieves the engineer of the responsibility for one of the most important functions in a steam generating plant.

Sales and Project Engineers

THE THERMIX CORPORATION
GREENWICH, CONN.

Canadian Affiliates: T. C. CHOWN, LTD.
1440 St. Catherine St., W., Montreal 25, Quebec
50 Abell St., Toronto 3, Ontario

Designers and Manufacturers

PRAT-DANIEL CORPORATION
SOUTH NORWALK, CONN.

For more data circle item code number on the postage free post card—p. 17

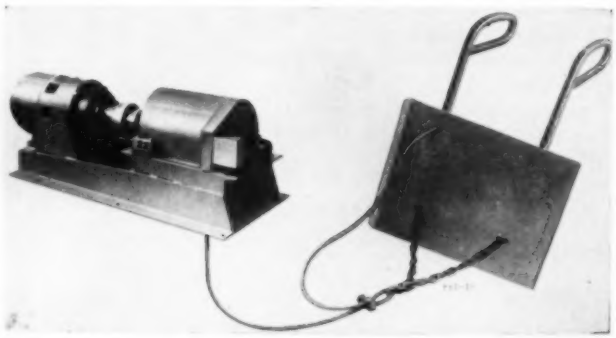
be made in standard electrical junction boxes. Standard pipe or conduit clips may be used to fasten cable to walls or ceilings. A tracer tube identifies corresponding tube ends between cable connecting points, since all tubes in a bundle maintain the same position relationship.

Five Pound Dry Chemical Portable Extinguisher

E-3 WALTER KIDDE & CO., INC., 40 East 34th St., New York 16, N. Y., has announced a new, pressure-operated, dry chemical portable fire extinguisher which answers the need for a small unit which can be recharged easily in the field.

The new unit has the same diffusion discharge pattern which has proved successful on the company's twenty and thirty pound models. The nozzle discharges a cloud-like pattern which is the most effective for extinguishing Class B (flammable liquid) and Class C (electrical) fires. With a range of five to seven feet, the cloud pattern also eliminates the possibility of splashing burning substances as a result of too forceful a discharge stream.

To service the *Walter Kidde & Company's* pressure-operated unit, following discharge, pour five pounds of dry chemical into powder chamber end, and with the aid of a gas station or factory air line, charge unit with 150 lb of compressed air. Extinguisher has built-in pressure gauge—should gauge fall below 150, additional pressure can be added to bring it up to designed operating pressure.



Automatic Power Scoop

E-4 THE JEFFREY MANUFACTURING COMPANY, 898 N. Fourth St., Columbus, Ohio, announces an automatic power scoop of new design for unloading all kinds of bulk material from box cars.

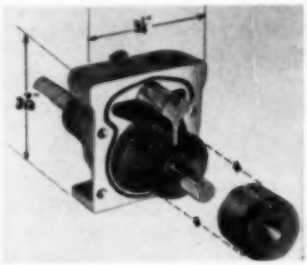
Operation is by an electric push button switch built into the handle of the scoop. This provides positive control as well as greater safety in operation. Forward movement of the scoop is started by pushing and holding the button while gripping the handle—instantly stopped by releasing the handle.

When pulling the scoop back, the cable is unreeled only the required length. There is no slack to interfere with operation. Thus the scoop can be moved backward and forward at will before moving material to the door for discharging.

Chemical Process Pump

E-5 ECO ENGINEERING CO., 12 New York Ave., Newark 1, New Jersey, announces a new line of chemical process pumps.

Because Du Pont Teflon is chemically and biologically inert and is entirely unaffected by any acid, organic solvent or alkali solution, the problem of choosing the right pump for a given job is greatly reduced. Eco ALLCHEM Pumps will convey virtually all fluid chemicals in the widest viscosity ranges.



DuPont Teflon impellers, bearings and packing featured in *Eco Engineering Company's* stainless steel chemical process pump. Conveys virtually all fluid chemicals in wide viscosity ranges; operates in either direction under pressures up to 60 psi with excellent lift; capacities 1 to 20 gpm; and available in 4 ports.

Tough and resilient, the Teflon Impellers are not subject to thermo-shock nor to galvanic attack by pitting or erosion. They can be stored indefinitely, since they are not subject to shelf deterioration.

The pumps are available in pump port sizes ⅜ in., ½ in. and ¾ in. pipe tap, with pulley drive base assembly, or base mounted direct connected with electric motors.

As standard equipment, they have Teflon Impellers, a Teflon packed stuffing box and a choice of Teflon or Graphitar self-lubricating bearings. Manufactured with stainless steel pump casings and shafts, these compact pumps are used for small volume process or laboratory work and find wide usage in transfer applications, to pilot plant and industrial applications. These positive displacement pumps are of particular interest to pharmaceutical, fine chemical and all other process plants. They provide an all-around pumping unit that will operate in either direction in capacities from 1 to 20 gpm and pressures up to 60 psi with excellent lift. Capacities subject to viscosity, temperature and specific gravity.

Money SAVING!

Bunting
Standard Stock Bearings
842 sizes

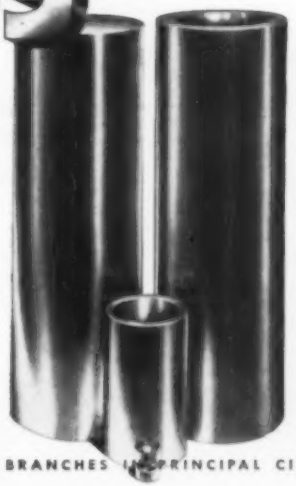
Bunting Bronze
Electric Motor Bearings
316 sizes

Bunting
Precision Bronze Bars
256 sizes

Completely machined and finished, meeting all bearing requirements in the production and maintenance of machine tools, industrial machinery and electric motors.

Bunting

BRONZE BEARINGS • PRECISION BRONZE BARS • BUSHINGS



...IN STOCK EVERYWHERE

Bunting products are instantly available in all markets, from the stocks of leading industrial distributors and distributors of specialized industrial items. Ask your distributor or write for catalog.

THE BUNTING BRASS & BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

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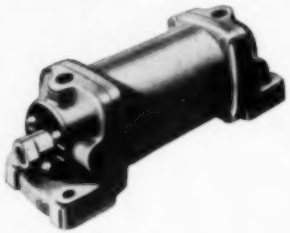
Air Cylinders

E-6 RIVETT LATHE & GRINDER, INC., Brighton 35, Boston, Mass., is offering a new line of air cylinders comprising 28 different models, each in 9 bore diameters.

The new air cylinder follows the design of the hydraulic cylinder by using keeper rings to hold covers together instead of the conventional tie rods. This feature permits covers to be rotated to convenient pipe locations and the cylinder applied in a minimum of space.



Recommended for pressures up to 150 psi, air cylinders of *Rivett Lathe & Grinder, Inc.*, are available in 7 mounting styles, in any length of stroke up to 96 in., and single or double-end rods.

Smoke Indicator and Control

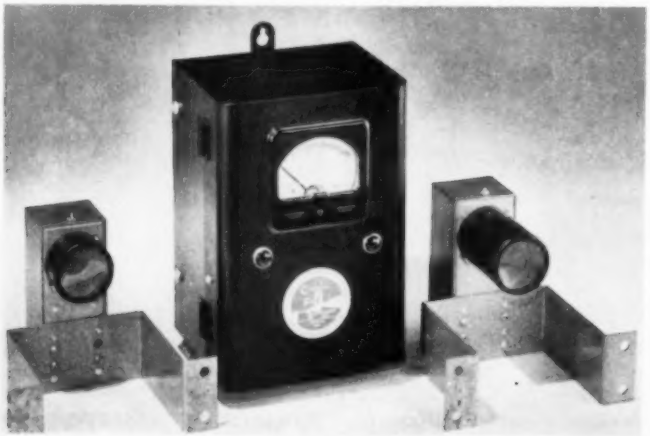
E-7 CLEVELAND FUEL EQUIPMENT CO., 7316 Associate Ave., Cleveland 9, Ohio, have added to their line new smoke indicators and controls.

They are cell systems which provide a constant check on smoke density. The system consists of three units: a light source; a photoelectric cell whose output is proportional to the density of the smoke; and a master control with amplifier, relay, smoke density meter calibrated in Rengelmann units, and signal lights.

The light source and photoelectric cell units are mounted on opposite sides of the breeching or smoke chamber, centered over two 2 in. holes in the breeching walls. Both light source and photocell unit are spaced from the breeching to permit natural air drafts to keep lenses cool and clean. The master control, which may be located remotely, can be set for a predetermined smoke density and no further adjustment is required. The indicator responds to any variation in smoke density. A non-adjustable time delaying circuit permits a small amount of smoke to pass before starting the control. This eliminates cycling of equipment.

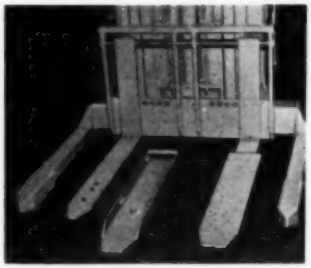
Standard units are available for either 110 volt or 220 volt 60 cycle current.

Smoke indicator and control of *Cleveland Fuel Equipment Co.*



Fork Extensions for Handling Both Large and Small Pallets

E-8 THE RAYMOND CORPORATION, 9089 Madison St., Greene, N. Y., formerly LYON-Raymond Corporation, has designed a new telescoping fork extension for use on their line of electric trucks which remains on the elevating forks at all times, thus eliminating the possibility of misplacing the extensions and offering assurance that they will always be readily available when required.



Formed steel channel sections with a retaining bar welded underneath fit over regular elevating forks on *The Raymond Corporation's* 2000 lb and 3000 lb capacity straddle type electric trucks. Locking pin welded to the fork extension drops into any one of a series of holes drilled in the elevating fork, making it possible to extend form to several desired lengths.

The manufacturer recommends them for use in public storage plants and warehouses carrying general merchandise, where light bulky loads can best be handled on large pallets while heavy materials can be stowed on relatively small pallets.

Heavy Duty Conveyor

E-9 MARKET FORGE CO., Materials Handling Div., Everett 49, Mass., has announced an extra light, high capacity, new Load-Veyor, designed to handle heavy loads.

This 12 in. wide conveyor is made in 5 ft and 10 ft sections with 45 deg and 90 deg curves to suit special and individual needs. Ball-bearing wheels 2 in. diameter and ⅝ in. wide are spaced on slightly less than 3 in. centers. Available with welded-on connectors which are inter-connectable with the majority of other wheel conveyors of the same size, it can also be supplied with removable type connectors.

Extra strength and durability is

They did

When this cotton manufacturer* searched for ways to produce more, he used a system that will profit every executive who wants to improve production. He saw a critical area that robbed his plant of finished products; his electrical distribution system. Every electrical storm broke down his system. The entire plant was shut down for hours.

what

So he asked Westinghouse engineers for the help we offer everyone . . . he asked for a method, a scheme to solve his problems, not a quotation on devices. His staff and ours worked out a distribution method using many devices—switchgear, panelboards, power centers, transformers—to meet his problems. Results: he cut power costs $12,000 a year; his system restricts any one electrical fault to only 5% of the mill.

you can do

His story is significant for any industry, any manufacturing process. It says you use capacity thinking to solve capacity problems. We want to do this kind of thinking with you or your engineers about your problems.

to produce more

You can choose the devices later. It's how you put them together that counts —whether air conditioning, lamps, electronic tubes, elevators or stokers. Many manufacturers make good electrical devices. Westinghouse, in fact, makes a broader line than anyone else. But the priceless ingredient Westinghouse offers you, in addition, is the skill of broadly experienced engineers in putting together the right combination of good devices to let you produce more with what you have. Westinghouse Electric Corporation, Pittsburgh, Pennsylvania.

*name on request

YOU CAN BE **SURE**... IF IT'S

Westinghouse

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Partial view of the new *Market Forge* Load-Veyor rated to take loads of 1000 lb covering the surface of the conveyor and for individual loads up to 300 lb per unit. Ten foot section weighs only 69 lb.

provided by use of tension members without the addition of unnecessary weight . . . the weight of a 10 ft section is only 69 lb. The standard arrangement is with the wheels set above the side channels.

Actual tests have proved that with a load of 200 lb distributed over the surface of the conveyor supported on only two stands, one at each end, there is less than ⅝ in. deflection at the center making the Load-Veyor practical for heavy loads without extra supports or stands.

Dust Filter Bag for Gases up to 500 F

E-11 MENARDI & COMPANY, 1222 East Grand, El Segundo, California, have developed a new filter bag, made of Maco silicone-impregnated glass cloth and claimed to filter gasses with a temperature range up to 550 F.

The company points out that dust filtration of industrial gasses has been limited by intense heat generated by the exhaust and the cost of the elaborate installations necessary to reduce the heat within a range that can be handled by wool or cotton bag filters. The temperature range of wool or cotton bags is limited to 200 F, whereas exhaust temperatures in many industries exceed 2000 F.

In the Maco process, glass cloth is silicone-impregnated, making it a smooth, durably flexible fabric with a heat resistance range that practically doubles the temperature range heretofore possible with bag filters. Tests have shown it to be 90 per cent efficient in the filtration of gasses having in excess of 40 per cent submicron particulate at temperatures up to 550 F.

The cloth is now available to suppliers of dust-filter bags. Cost is generally less than that of good grade wool.

W. E. Ballard, general manager of Menardi and Company, holds a sample of the new fabric.

Overload Release for the Torque-Arm Speed Reducer

E-10 DODGE MANUFACTURING CORPORATION, Mishawaka, Ind., has developed an overload release for the Dodge Torque-Arm Speed Reducer, which provides instant and positive protection for driven machines, motors and the speed reducer itself.

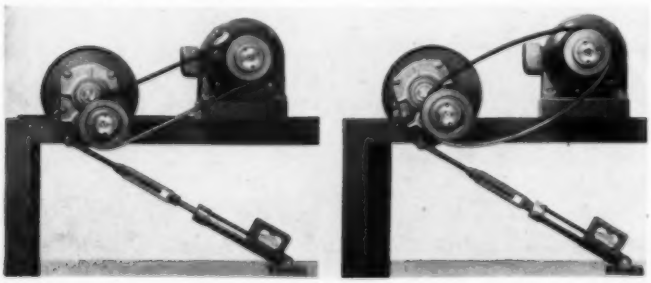
Designed to prevent breakdowns, avoid expensive repairs, and insure against interruptions of production resulting from any excessive load on the equipment, the new product has been named the Dodge Tri-Matic Overload Release because of the triple protection which it affords.

Pressure exerted by an excessive load causes a piston to move lengthwise through the unit and this movement loosens the belts and cuts off the current simultaneously. The warning system is hooked up to the micro switch.

The device is calibrated for adjustment to the load conditions of any job. It can be set to act at any desired load up to the reducer's maximum capacity.

This new unit replaces the standard torque-arm that is regularly furnished with the Dodge Speed Reducer.

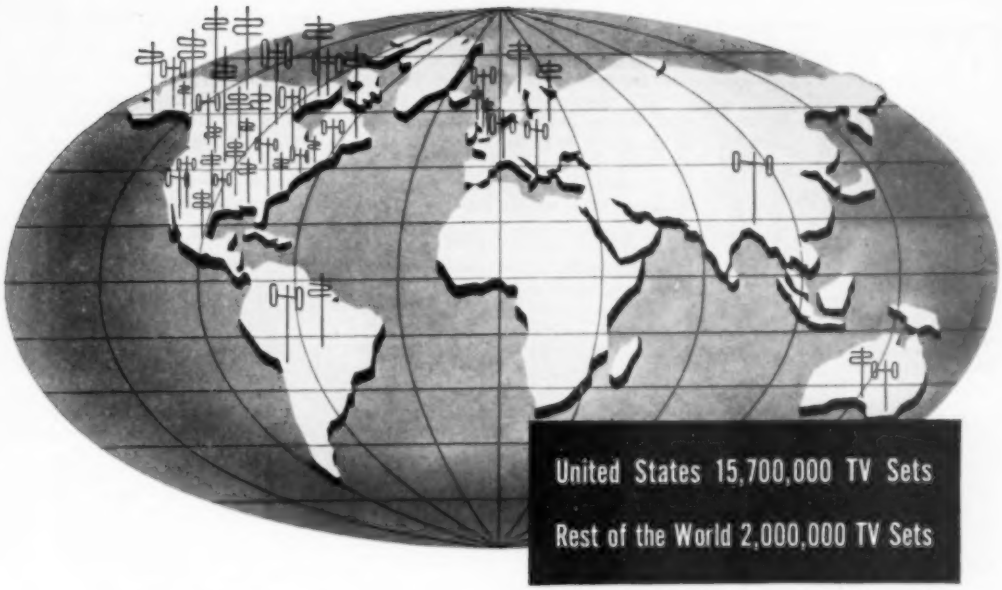
Overload release for the *Dodge Manufacturing Corporation's* Torque-Arm Speed Reducer is shown set and tripped. Release operates both mechanically and electrically to loosen the belts, cut off the current, and activate a warning bell, siren or light.



Heavy Duty Process Pump

E-12 PEERLESS PUMP DIVISION, FOOD MACHINERY AND CHEMICAL CORPORATION, Los Angeles 31, Calif., has recently introduced a new process pump to pump petroleum hydrocarbons, water and chemical solutions at elevated temperatures and pressures.

General characteristics show that the pump provides capacities up to 1000 gpm and operating heads up to 625 feet. Temperatures of liquids pumped can be up to 850 F. Horizontal electric motor drive is standard but others such as steam turbine or



COMPETITION Turns Luxuries into Necessities

Two millions of people throughout the world, washing machines, radios and television sets are miraculous inventions remote from their lives . . . for the wealthy only.

In the United States, however, a new product appears in no time in the homes of wage earners as well as salaried executives.

Consider television, for example. Only 6,500 sets produced in 1946 . . . over 5,000,000 in 1951. Or washing machines . . . more than 24,000,000 in 10 years.

What has Competition to do with this?

Do you think we'd continue to get more and better products if only one company made each item or each line?

No! We get more and better products here in America, because anybody who thinks he can make anything better or sell it more efficiently is free to try.

And many succeed. Take electrical products like radios and television sets . . . and home appliances like washing machines and electric fans. Does the biggest company monopolize this industry? Not by a long shot! Even counting all its affiliated companies, it still sells less than 1/5 of such products bought in this country.

There are nearly a thousand other companies that make home appliances, radios and television sets. And they do more than 4/5's of the business! The smallest of them make the biggest companies hustle their bones to keep making products better and better.

In America, a better product can always win consumer acceptance in any field.

Let's keep the COMPETITIVE SYSTEM working for us

The Competitive System can be killed! When industries are run by government, when taxes are so high that they destroy the incentive to work hard and risk savings in business ventures, the Competitive System languishes and dies.

You've seen it happen in other lands. Let's not let it happen here.

Let's all of us watch closely to see that those who represent us in government are working with us and for us to preserve our Competitive System; to assure a tax structure that leaves enough incentive to make hard work worthwhile, so that *any* man with ability and energy has a chance to earn good money and keep most of it.

Competition thrives best where the rewards are high. People live best where competition thrives.

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

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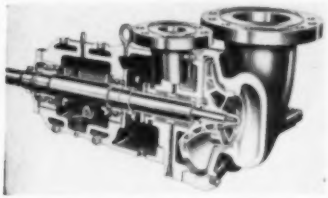


Horizontal center-line-mount pump by *Peerless Pump Division, Food Machinery and Chemical Corporation,* is designed for heavy duty process service, temperatures to 850 F, operating heads to 625 ft.

stationary engine can be furnished. The pump's liquid end can be furnished in cast iron, bronze, carbon steel, stainless steel or other materials as required by intended application or service. Two models are offered, one with top suction—top discharge, the other with end suction—top discharge, to suit existing or planned piping arrangement.

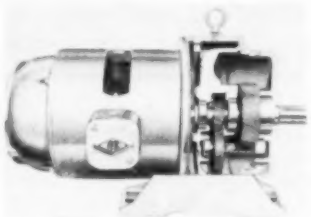
Several important construction features are incorporated in the design of this new pump the manufacturer states. The center-line-mount design maintains pump alignment at any temperature. The positive support beneath the pump case prevents strains being imposed on the rotating parts, adding to both bearing and packing life. The vertically split case, with single joint, and a fine metal clad gasket insure tightness against loosening or leaking. All internal joints have been eliminated when differential pressure across them would cause leakage or corrosion. Water cooled stuffing box has in-and-out water cooling connections, removable throat bushing, by-pass lantern to relieve pressure back to the suction and a quench type packing gland to provide protection against the escape of hazardous liquids through the packing. Slingers and specially recessed bearing caps both inside and outside of both ends of the bearing housing are designed to prevent oil leaking out of, or any kind of dirt entering into the housing.

Gear Reducer

E-13 REULAND ELECTRIC COMPANY, Alhambra, Calif., has introduced a new gear reducer with internal fluid coupling, which consists of a standard fluid-shaft motor and gear train, designed into a single, compact unit.

Its purpose is to convert the motor's conventional high-speed into a slow-speed, high torque output. The integral fluid coupling provides cushioned starting of heavy loads and protection against "jamming" of equipment. Ideal applications are cranes, conveyors, dryers, mixers, car pullers and other machinery where heavy loads require smooth acceleration at reduced motor speeds.

Power-take-off shaft, gears and bearings are located immediately adjacent to the vertical centerline of the strong pyramidal base. Load pull is thus transmitted direct to the base, minimizing any lateral stress. Gear and bearing wear are reduced. Mounting in close quarters is made easier. All gears operate in an oil bath, assuring positive lubrication at all times. Helical gears are hobbed from special alloy steels.



Reuland Electric Company's new fluid-drive gear reducing unit.

Standard units are available with squirrel cage, fluid-shaft or slip ring driving motor, either polyphase or single phase. Gear train can be either single or double reduction. All are available in either drip-proof or totally enclosed designs. Output speeds are from 1 to 600 rpm.

Cleaner for Metal Parts

E-14 MAGNUS CHEMICAL COMPANY, Garwood, N. J., announces a new cleaner for all kinds of metal parts.

The new product is said to be safe for all metals—not attacking, pitting or marring aluminum alloys, bearing metals, cadmium, solder, die cast, or any other soft metal.

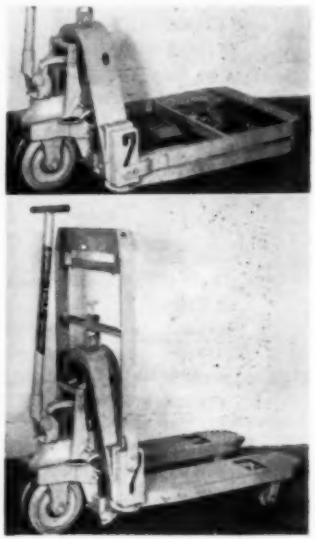
The cleaner is non-inflammable. It can be used in either hot or cold solution and is followed by a simple cold water rinse after the cleaning period. Work can be placed in the cleaning solution and left there until it is needed. A pressure spray rinse with water or with safety solvent produces a clean part, ready for use.

Where a large volume of parts is to be cleaned regularly, the manufacturer recommends that the cleaner be used in the company's cleaning machine, where agitation speeds up the cleaning action and all traces of deposits are removed, making hand brushing unnecessary.

Dual-Purpose Trucks

E-15 THE YALE & TOWNE MANUFACTURING COMPANY, Philadelphia Division, 11,000 Roosevelt Blvd., Philadelphia 15, Pa., is now producing hand lift pallet trucks with a dual-purpose superstructure that will enable them to handle 7 and 12 in. skids as well as single or double faced pallets.

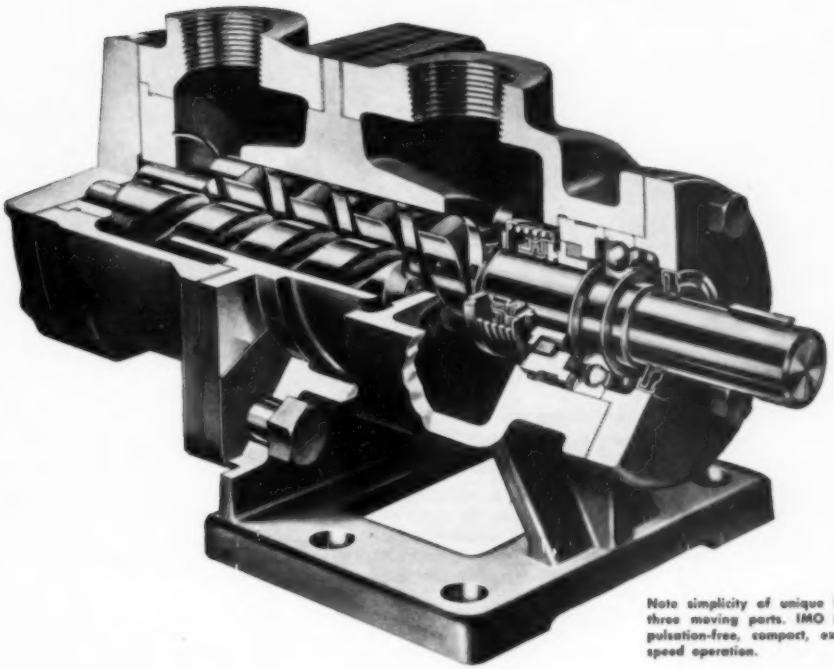
When the superstructure is in a raised position, it is clamped vertically to provide a backrest for the pallet load on the truck. When lowered, it is adjustable to either 7 or 12 in. skid heights by a simple cam and slot arrangement. The truck is designed especially for use in plants and business establishments where there is not sufficient volume of either skids or pallets to keep a specialized truck for each, or where flexibility is desired because of varying loads.



Hand lift pallet trucks of *Yale & Towne Manufacturing Company* are now available with a dual-purpose superstructure that enables them to handle 7 and 12 in. skids as well as single or double faced pallets.

(*Continued on page* 140)

NOW...a new **LOW-COST** IMO for HIGHER pressures



Note simplicity of unique IMO design—only three moving parts. IMO is reliable, quiet, pulsation-free, compact, excellent for high-speed operation.

You've either heard about or used the proven De Laval—IMO A313A pump. Now De Laval brings you the A313B IMO for a wide variety of oil handling applications for higher pressures. This quality-designed, quantity-produced pump saves you up to 40% in initial cost over other IMO models for pressures up to 275 psi.

This new rotary positive displacement pump gives you all the advantages of the famous IMO pumping principle. Use it for capacities to 80 gpm, pressures to 275 psi and intermittent pressures to 325 psi... It handles light or viscous fluids in hydraulic systems, rotary and steam atomizing oil burners, lubrication, governing systems and similar services.

DE LAVAL OFFERS IMMEDIATE DELIVERY OF NEW **IMO PUMP!** WRITE TODAY!

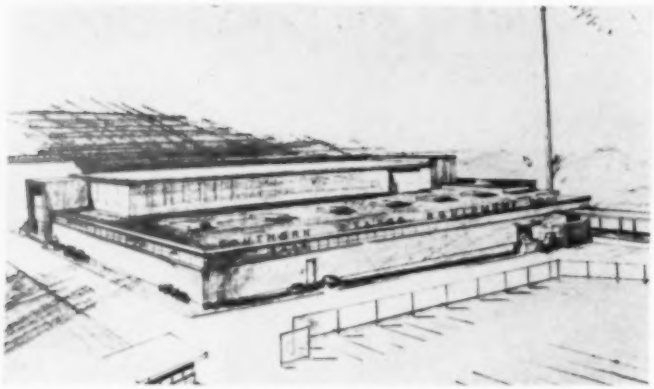
DE LAVAL *IMO Pumps*

STANDARD PRODUCTS DIVISION

DE LAVAL STEAM TURBINE CO., TRENTON 2, NEW JERSEY

DL-124

NEWS for the South and Southwest



This artist's sketch depicts how the new structure will appear when completed this fall. Building will be a one story steel and masonry structure covering approximately 25,000 sq ft. General offices will also be enlarged and modernized.

FUTURE EVENTS
Of Engineering Interest

ILLUMINATING ENGINEERING SOCIETY, A. Dexter Hinckley, Exec. Sec'y, 51 Madison Ave., New York 10, N. Y.
Apr. 6-8, Southwestern Regional Conference, Hotel Tulsa, Tulsa, Okla.
Apr. 20-22, Southern Regional Conference, Hermitage Hotel, Nashville, Tenn.
AMERICAN SOCIETY OF LUBRICATION ENGINEERS, W. F. Leonard, Sec'y, 343 S. Dearborn St., Chicago 4, Ill.
Apr. 7-9, Statler Hotel, Cleveland, Ohio.
SILICONE EXPOSITION, M. H. Leavenworth, Dist. Mgr., Dow Corning Corp., 2722 Taylor St., Dallas, Texas.
Apr. 9-11, Hotel Broadview, Wichita, Kans.
Apr. 15-17, Hotel Texas, Fort Worth, Texas.
Apr. 23-24, Shamrock Hotel, Houston, Texas.
SOUTHEASTERN ELECTRIC EXCHANGE, J. W. Talley, Mgng. Dir., 302 Haas-Howell Bldg., Atlanta, Ga.
Apr. 21-23, General Conference, Boca Raton Hotel and Club, Boca Raton, Fla.
NATURAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y, 422 Kennedy Bldg., Tulsa 3, Okla.
Apr. 30-May 2, Annual Convention, Rice Hotel, Houston, Texas.
FOURTH INTERNATIONAL LIGHTING EXPOSITION AND CONFERENCE, Lighting Exposition Management, 511 Terminal Tower, Cleveland, Ohio.
May 6-9, Cleveland Municipal Auditorium, Cleveland, Ohio.

Southern States Equipment Company to Expand Hampton, Georgia, Facilities

Construction has been started on a new, one story building to join the present facilities of the Southern States Equipment Corporation, at Hampton, Georgia.

Specifically designed to complement the existing facilities, the new building will greatly increase available manufacturing space. The result will be an integrated arrangement of floor space providing improved communication between departments and a better flow of material to and from production machines. The new structure will be arranged to allow simultaneous loading and unloading of rail cars and large trucks.

The building program will include considerable revision of the existing facilities. The general offices will be enlarged and modernized. Improved lighting and air conditioning will be installed and departmental sections will be rearranged for easier communication.

Other features of the completed building program will be an employees' cafeteria and a fireproof vault for protection of all important drawings and documents.

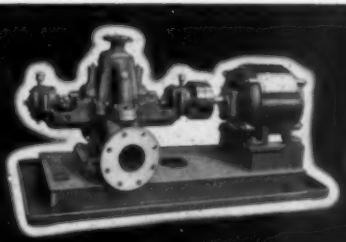
Southern States began operations in Birmingham, Alabama, in 1916. In 1940 the present facility was acquired and during the war years it was used for the production of ordnance material. Although the Birmingham operation was in full production during this period many of Southern States key personnel were transferred to supervise the war work in Hampton. As a result Southern States established enviable production records. In 1945 the entire operation was moved from Birmingham to Hampton.

Ground is broken in Hampton, Georgia, for the new addition to the present facilities of Southern States Equipment Corporation, manufacturers of high voltage electrical equipment, mechanical devices and textile machine parts. Southern States officials taking part in the ceremony are, in the usual order, *C. W. Walter*, sales manoager, mechanical division; *W. C. Mitchell*, vice president; *Glenn Mitchell*, production manager; *Olan Richardson*, president; *T. E. Curtis*, chief engineer, electrical division; and *T. A. Burdeshaw*, sales manager, electrical division.

WARREN...the most complete line of industrial pumps available from one source

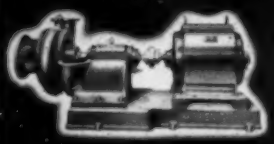
CENTRIFUGAL • RECIPROCATING • SCREW • ROTARY

Warren-Quimby Gear-in head Screw Pump



Warren Condensate Pump

Warren Horizontal Duplex Hydraulic Pump

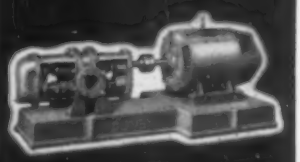


Warren Type "L" Single-Stage Single-Suction Liquor Pump

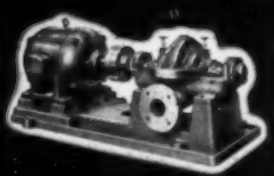
There's a Warren or Warren-Quimby Pump for practically all industrial pumping applications, and our large variety of types and sizes assures an unbiased recommendation. The value of this should not be underestimated because a recommendation that barely meets operating conditions and requirements can prove to be anything but a profitable long range investment, regardless of any initial advantage in cost.

It will pay you to check with Warren on your next pumping job.

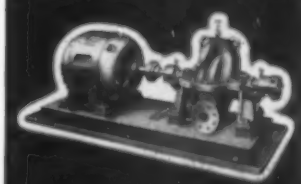
P-52



Warren-Quimby External Gear and Bearing Rotex Pump



Warren Type DBL, Single-Stage Double Suction, Centrifugal Pump

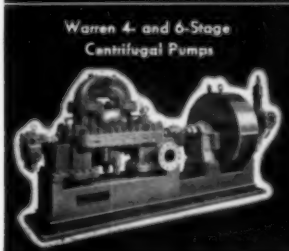


Warren Two-Stage Volute Centrifugal Pump

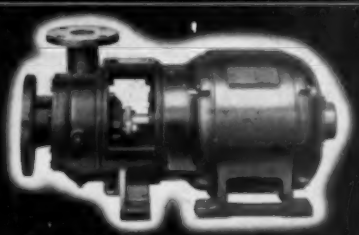
WARREN QUIMBY PUMPS

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS



Warren 4- and 6-Stage Centrifugal Pumps



Warren "Compacunit"—4 Types—42 Sizes

Warren Horizontal "Realwear" Duplex Piston Pump

Make boiler water level reading
positive—mistake-proof—with
EYE-HYE
Remote Reading Indicator
Gage reading at eye-height any reasonable distance from drum
Easy to read, like conventional gage
Illuminated green fluid gives sharp clear indication
Simple, manometer principle, no complicated working parts
Easy to install, practically no maintenance
Models for all pressures, from 0 to 2000 pounds
Panel-mounted EYE-HYE
Wall-mounted EYE-HYE
Reliance EYE-HYE
Write for full data on EYE-HYE—tell us working pressure and control location
Complete line of Water Columns, Gages and other trim for all working steam pressures.
The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, Ohio
Reliance EYE-HYE
Remote Reading Gage
All-hydrostatic • Reads like a tubular glass gage

news (continued)

Houston Consulting Firm Announces Partnership

H. E. BOVAY, JR., consulting engineers, Esperson Building, HOUSTON 2, TEXAS, formerly an individual professional engineering practice, has become a partnership.

The latter consists of H. E. BOVAY, JR.; BENNETT W. BURNS, formerly assistant chief designer, Humble Oil and Refining Company, Baytown, Texas; and CHARLES A. LAWLER, J. WAYNE HOLLAND, and RICHARD B. ROBERTSON, previously chief engineer and senior engineers, with H. E. Bovay, Jr., consulting engineers.

H. E. Bovay, Jr.

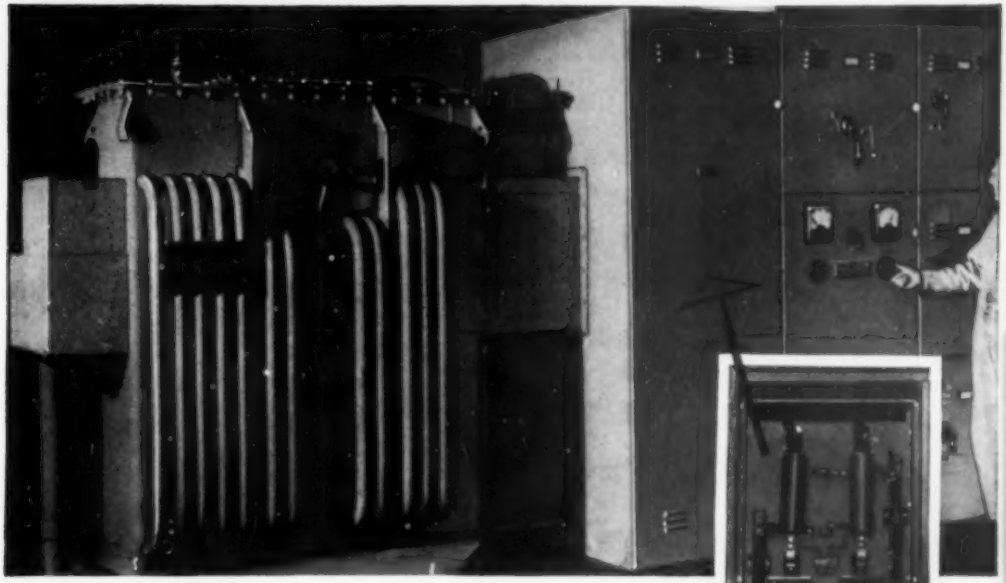
Formation of the partnership reflects the growth of the organization, which has risen since January of 1946 from one to thirty engineers, together with draftsmen and clerical personnel. The organization gives a wide range of engineering services to industrial clients, including major oil, chemical, lumber, and production manufacturing companies.

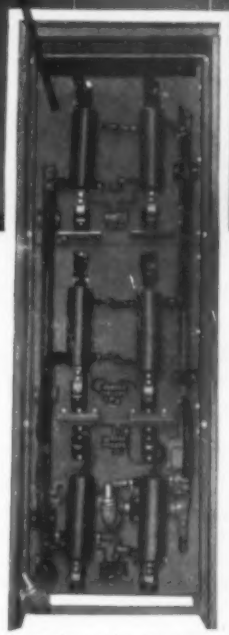
H. E. BOVAY, JR., a graduate of Cornell University and a registered professional engineer in the states of Texas, Louisiana, and Arizona, headed up the original organization bearing his name. He was formerly an engineer for a contractor and for the U. S. Engineer Corps in the Mississippi Valley and was with Humble Oil and Refining Company for ten years, acting as project engineer on a number of their major installations.

BENNETT W. BURNS, graduate of The Rice Institute, was formerly associated for fifteen years with Humble Oil and Refining Company in various capacities, finally as assistant chief designer in the refining department.

CHARLES A. LAWLER is a graduate of the University of Texas and has had experience with the Texas Highway Department and the Humble Oil and Refining Company. He has also

Now, St. Paul Foundry & Mfg. Co. buys all its power; saves $25,000 annually!





This photo shows the simple, compact design of the G-E ignitron mercury-arc rectifier unit. No major moving parts to wear out. No bearings or brushes to check. No vacuum pump required.

Costly, Inefficient Steam Generating Plant Replaced by

D-C UNIT SUBSTATION

Boiler capacity for cold weather heating is all that the St. Paul (Minn.) Foundry and Mfg. Co. retains of its former steam-driven d-c generating plant. By using purchased power, the company saves $25,000 annually in fuel, operating, and maintenance costs.

Purchased power is a-c, but the plant requires d-c power for yard cranes and hoists. To tie these two systems together, a six-tube G-E sealed ignitron rectifier was installed. It operates 24 hours a day, 7 days a week.

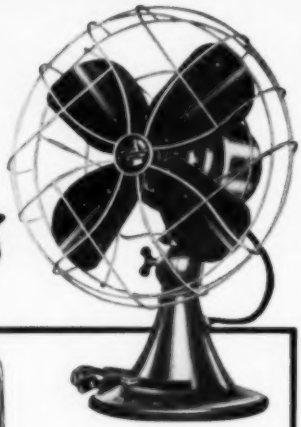
General Electric d-c unit substations with modern sealed ignitron rectifiers occupy minimum space. The transformer, rectifier and low-voltage switchgear are supplied as a complete, metal-enclosed, packaged unit. Absence of exposed, energized parts provides maximum protection to personnel. For information on d-c unit substations to fit your d-c power needs, call or write your nearest G-E sales office. General Electric Company, Schenectady 5, N. Y.

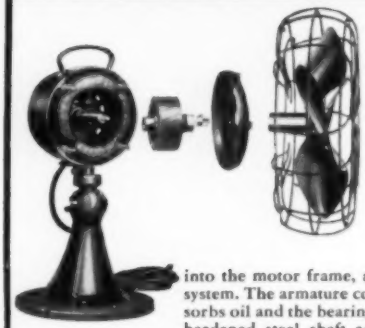
GENERAL ELECTRIC

5364

BREEZE-CONDITION

for years to come with EMERSON-ELECTRIC Oscillators





EXCLUSIVE
bearing construction means longer life...

The fan armature rotates on a stationary ½-in. diameter, case-hardened, hollow-steel shaft pressed into the motor frame, and has a force-feed lubricating system. The armature core is porous cast-iron which absorbs oil and the bearing surfaces of both core and case-hardened steel shaft acquire a fine glaze, like plated metal, which makes practically an everlasting bearing.

In addition to the above exclusive features, Emerson-Electric 12-inch and 16-inch oscillators also have finger-tip oscillation adjustment, from stationary to 90°, and three-speed sliding switch in base. You'll get "breeze-conditioning" for years to come with a minimum of servicing. All, of course, backed by the famous 5-Year Factory-to-User Guarantee.

THE EMERSON ELECTRIC MFG. CO., ST. LOUIS 21, MO.

FREE FAN CATALOG!
Get the facts about the most complete line of fans in America! See the new models for '52! Write for Catalog No. T55.

EMERSON ELECTRIC
FANS • MOTORS — APPLIANCES

been a design engineer with Brown and Root, Inc., and joined H. E. Bovay, Jr., in a similar capacity in 1947.

J. WAYNE HOLLAND was educated at Texas Technological College and the University of Washington. He was mechanical engineer with the Austin Company and with Hudson Engineering Corporation, and chief engineer for the Clovis Contracting Company of Clovis, New Mexico.

RICHARD B. ROBERTSON, a graduate of Purdue University, was on the engineering staff of United Air Lines designing and testing airplane equipment and accessories.

Frank A. Thomas, Jr., S.M. of Norwalk Valve Company

FRANK A. THOMAS, JR. has joined NORWALK VALVE COMPANY of South Norwalk, Conn., as Sales Manager.

Frank A. Thomas, Jr.

Mr. Thomas had been assistant to the Vice President in charge of Sales for the Foster Engineering Co., Union, N. J. He was, for 4 years before, Supervisor of Southern Sales for Leslie Co., Lyndhurst, N. J.

Republic Rubber—Mo., W. Va.

REPUBLIC RUBBER DIVISION, LEE RUBBER & TIRE CORP., Youngstown, Ohio, has announced the promotion of KARL H. DRESSEL to field engineer with headquarters in ST. LOUIS, MO. He will be responsible for contacting the industrial organizations in the State of Missouri in the interests of the company's line of belting, hose, and molded and extruded rubber products.

It has also been announced that ALFRED W. CREW has joined the Republic Rubber Division as a field engineer. Mr. Crew's headquarters will be in CHARLESTON, WEST VIRGINIA, where he will serve coal mine operators and industrial accounts.

TOUGH LAYOUTS

- ✔ Assured Safety
- ✔ Efficient Operation
- ✔ Minimum Fuel Costs
- ✔ Low Maintenance
- ✔ Long, Trouble-Free Life

MADE SIMPLE BY NAVCO

The high degree of skill acquired by Navco Engineers from long experience in solving unusual Piping problems is your guarantee of an accurate and workmanlike Piping System.

Consult Navco for your next Piping Job

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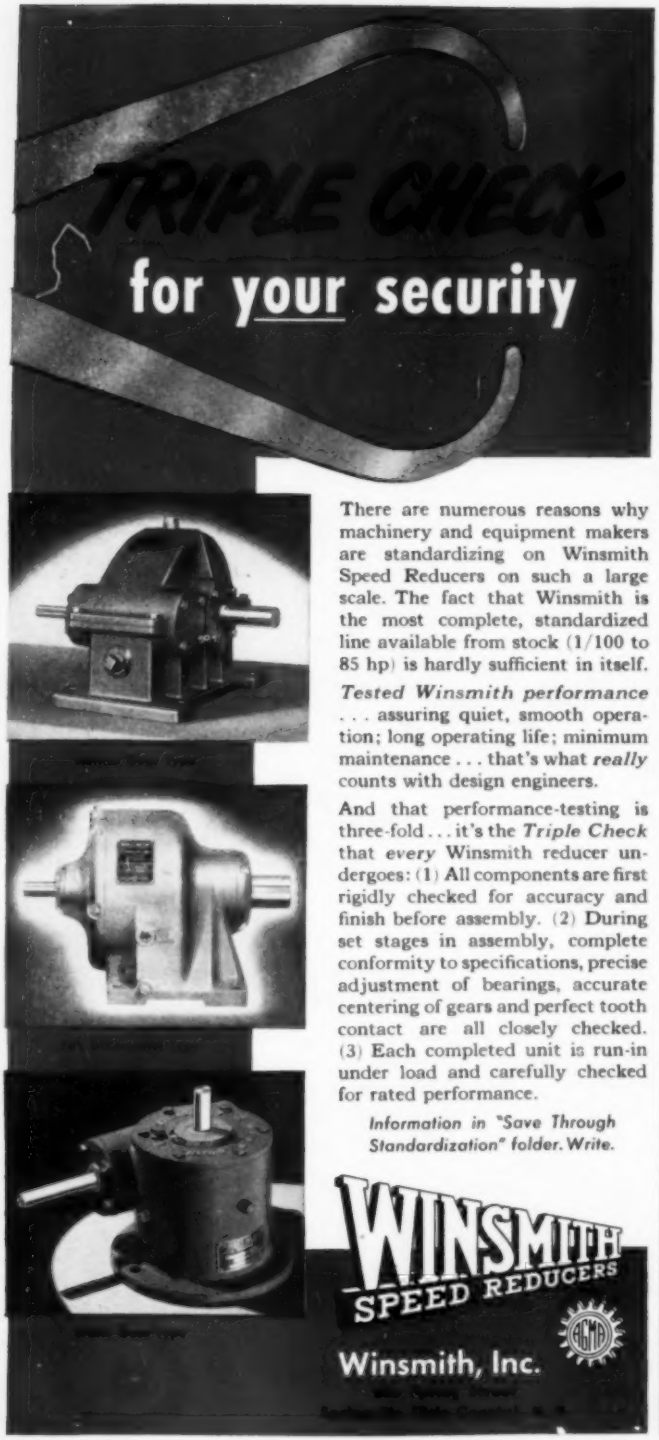
NATIONAL VALVE & MANUFACTURING COMPANY • PITTSBURGH, PA.

NEW YORK • CHICAGO • CLEVELAND • BOSTON • ATLANTA • TULSA • BUFFALO • CINCINNATI


TRIPLE CHECK
for your security
There are numerous reasons why machinery and equipment makers are standardizing on Winsmith Speed Reducers on such a large scale. The fact that Winsmith is the most complete, standardized line available from stock (1/100 to 85 hp) is hardly sufficient in itself.
Tested Winsmith performance . . . assuring quiet, smooth operation; long operating life; minimum maintenance . . . that's what really counts with design engineers.
And that performance-testing is three-fold . . . it's the Triple Check that every Winsmith reducer undergoes: (1) All components are first rigidly checked for accuracy and finish before assembly. (2) During set stages in assembly, complete conformity to specifications, precise adjustment of bearings, accurate centering of gears and perfect tooth contact are all closely checked. (3) Each completed unit is run-in under load and carefully checked for rated performance.
Information in "Save Through Standardization" folder. Write.
WINSMITH
SPEED REDUCERS
Winsmith, Inc.

Koppers Fan Representative Appointed—Atlanta, Ga.

KOPPERS COMPANY, INC., recently announced the appointment of EVANS L. SHUFF & ASSOCIATES to represent them for Koppers AEROMASTER industrial cooling fans in Georgia, Tennessee, Florida and North and South Carolina.

This Atlanta sales organization has represented Koppers for sale of FAST'S COUPLINGS for a number of years. Their office is at 303 Five Ivy Building.

Riley Stoker Corporation Engineering Dept. Promotions

Mr. MAX H. KUHNER, Vice President — Engineering, recently announced several promotions in the headquarters engineering staff of RILEY STOKER CORPORATION at Worcester, Mass.

Mr. C. FREEMAN HAWLEY, now Chief Mechanical Engineer, joined Riley after graduation from Worcester Polytechnic Institute in 1923. He was loaned to the Test Department of Public Service of New Jersey in 1924, and later became Design and Service Engineer associated with development of pulverized coal equipment for Riley until 1932. He became Assistant Chief Mechanical Engineer in charge of Pre-Sale Engineering of Steam Generating Equipment, which position he held until his recent promotion. Mr. Hawley is a member of A.S.M.E., a Registered Professional Engineer, and a member of the National Society of Professional Engineers.

Mr. L. DUDLEY BRUCE, promoted to Chief Project Engineer, came to Riley in 1928, and then served three years with Babcock & Wilcox Contract Engineering Department—returning to Riley in 1933 as Design Engineer of Fuel Burning Equipment. He served as Project Engineer from 1936 to 1947, and Supervising Mechanical Engineer until 1952. He is a Registered Professional Engineer of Massachusetts.

Mr. ALDEN G. CARLSON, promoted to Chief Structural Engineer, acquired experience with consulting engineers and in structural steel fabricating shops after his graduation from Worcester Polytechnic Institute, and joined the Riley engineering staff in 1933 and was in charge of the structural steel department since 1937. He is a Registered Professional Engineer, and a member of National Society of Professional Engineers.

Public Service—Okla.

H. S. KILBY, formerly vice president of Western Light and Telephone Company, Inc., in Kansas, has joined the PUBLIC SERVICE COMPANY of OKLAHOMA as assistant to the president.

Kilby is organizing the company's industrial development department. His office is in the Public Service building at TULSA, and his field of operation will be the entire area served by the company in eastern and western Oklahoma, as well as much of the United States.

The company's industrial development plan will include promotion of new industries in the area and assistance in the development and expansion of existing industries now served by the company's electric power system. Mr. Kilby will work in close cooperation with the industrial departments of railroads, other utilities and with the Oklahoma Planning and Resources Board.

Gulf States Utilities Announces Expansion Program

Plans to increase electric power production capacity of GULF STATES UTILITIES by 50 per cent in the next three years to take care of industrial and general growth in the area served by the company, were announced recently by ROY NELSON, company president.

The company's construction program will involve financing of an investment of $75,000,000 in the period of 1952 through 1954. Directors of Gulf States approved a construction budget of $25,500,000 for 1952.

Plans call for increasing capacity of many sub-transmission lines and general strengthening of facilities. Gulf States was scheduled to complete a unit of 66,000 kilowatt capability at Neches Station in Beaumont in March. Other Turbo-generator units scheduled for completion in the three year program are a 66,000 unit at Scott, Louisiana, and a 66,000 unit and two 46,000 units in Baton Rouge. The latter will be of non-condensing type to supply steam as well as electricity to several large Baton Rouge industries.

In the Beaumont-Port Arthur area the construction program calls for a new transmission line from Neches Station to Orange and one from the Station to Kolbs Crossing at Port Arthur to provide additional capacity to serve Port Arthur and the Mid-County industries.

These sump pumps embody the latest and most modern developments such as:

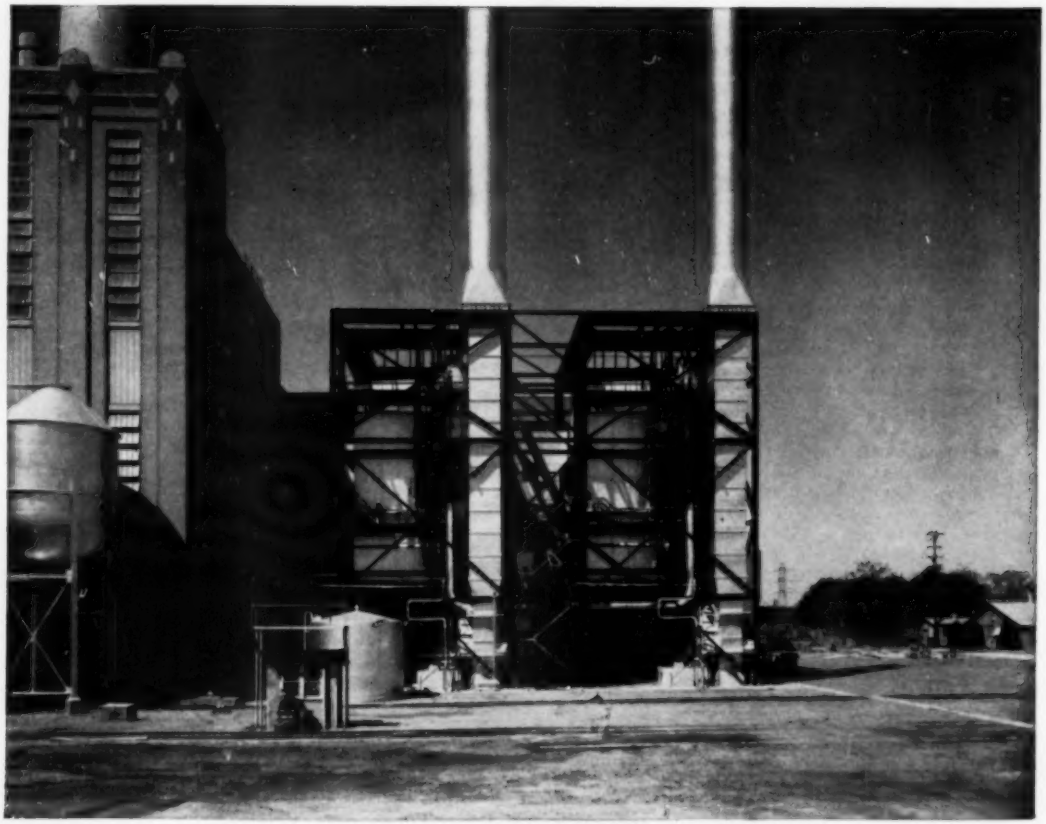
- Positive alignment of all rotating and guide bearing parts
- Flanged column pipe connections
- Motor mounting for standard NEMA type "C" flange
- Adjustable semi-open type impeller
- Heavy duty construction
- Discharge sizes 1 to 10 in. pipe
- Capacities up to 3000 G.P.M.
- Discharge heads up to 140 feet
- Lengths up to 21 feet
- Motor horsepower up to 75 HP.

Send for DEMING SUMP PUMP Bulletin

THE DEMING COMPANY
549 Broadway, Salem, Ohio
Send copy of illustrated Bulletin No. 4600-A on Deming Sump Pumps.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Two Outdoor Boilers Under Automatic



Outdoor Installation of Two Large Boilers at the Trinidad Steam Electric Station.

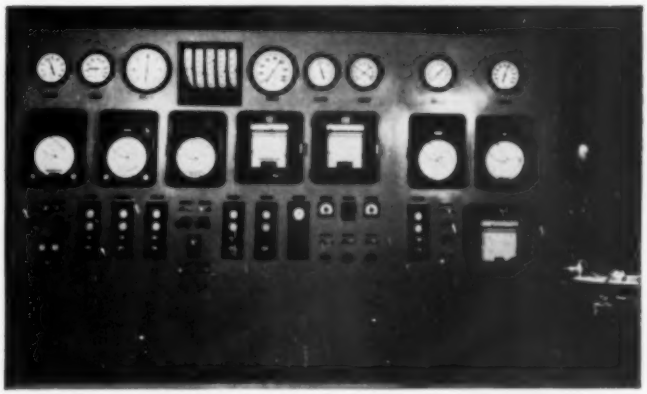
Aerial View of Trinidad Steam Electric Station. (Note the Two Outdoor Boilers Installed Behind the Main Building).

Control

at TRINIDAD STEAM ELECTRIC STATION • Texas Power & Light Company

● A most important part of the Texas Power and Light Company expansion program at their Trinidad Steam Electric Station, is this outdoor installation of two new gas fired, 350,000 lb. per hr. boilers. These boilers, operating at 920 psig., provide 70,000 KW additional capacity to meet the increasing power demand on the Trinidad Station. To achieve maximum efficiency and performance, the boilers were put under completely automatic control.

The AUTOMATIC COMBUSTION CONTROL system and the PRESSURE REDUCING AND DESUPERHEATING STATION were supplied by REPUBLIC FLOW METERS CO.



One Section of the Boiler Control Panels.

A Potent Tool for Cutting Costs

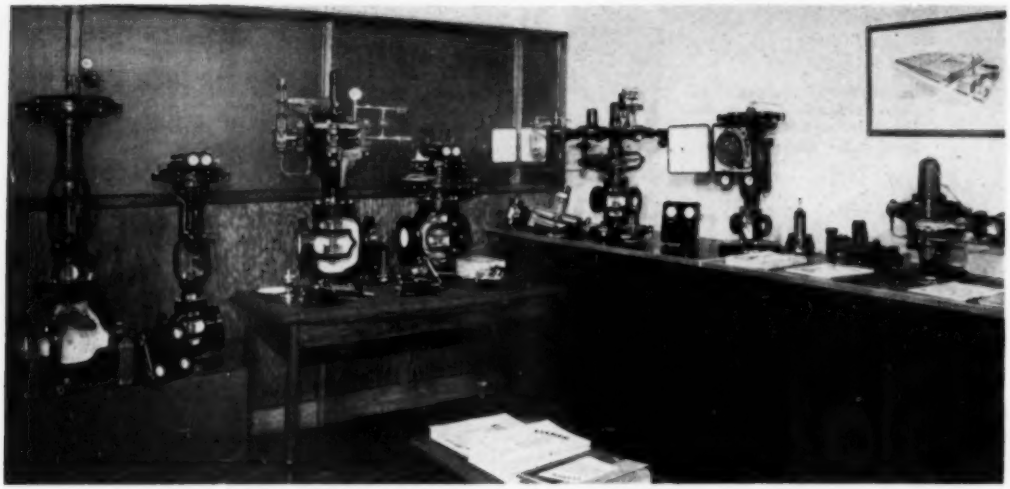
A properly engineered automatic control system is an effective way to cut power costs. Best of all, what automatic control is doing for the large plants such as the Trinidad Steam Electric Station it is also doing for their smaller brothers. But the full benefits can only be realized if the plant designer selects with great care the best control equipment for his job. The control must be carefully matched to the boiler and auxiliary equipment characteristics; it must maintain maximum combustion efficiency under all load conditions.

REPUBLIC CONTROLS are available for all types of load fluctuations, fuel firing, single or multiple fuels, and all types of boilers and auxiliary equipment. Backed by thirty-six years of specialized experience in combustion control, REPUBLIC'S power engineers have developed control systems to answer every type of steam generating problem.

Ruggedly built to outlast the boilers that they serve, REPUBLIC AUTOMATIC CONTROL gives you the best, most economical system engineered to suit your needs.

For more information on **REPUBLIC AUTOMATIC CONTROL** write for Data Book No. S-21 or contact our field engineer nearest you.

REPUBLIC FLOW METERS CO. ● 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS



Traveling Exhibit Demonstrates Fisher Gas Regulators in Southeast

Gas Regulator Exhibit displayed in offices of *Rittelmeyer & Company* offices, 150 Nassau St., N.W., *Atlanta, Ga.* Rittelmeyer also showed this Fisher Governor Company equipment at *Chattanooga* and *Knoxville, Tennessee.*

Fisher Governor Company's gas regulator equipment exhibit is made up of a widely representative group of FISHER regulators for the gas industry, all of which are sectional models. They are shipped around the country in a specially fitted truck and the individual exhibits are set up by the area representatives who in turn invite interested persons to visit the showing.

GENERAL
REG. U.S. PAT. OFF.

RODA — High grade gas, by-product, steam and household stoker coal from Wise County, Virginia, on the Interstate Railroad.

GLENDROID — High grade gas, by-product, steam and domestic coal from Wise County, Va., on the Interstate Railroad.

STONEGA — High grade, high volatile steam and by-product coal from Wise County, Va., on the Interstate Railroad.

GLENBROOK — The Premium Kentucky High Splint unmatched for domestic use. Produced in Harlan County, Kentucky, on the L. & N. Railroad.

COKE — Roda and Stonega from Wise County, Va.

CRITERION COAL — High grade gas, by-product, steam and domestic coal—Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna. Railroad.

HAMPTON COAL — High volatile domestic, steam and by-product coal from Boone and Logan Counties, W. Va., on the Chesapeake & Ohio Ry.

CROZER — Genuine Pocahontas from McDowell County, W. Va., on the Norfolk & Western Railway.

LYNCO — High fusion coking coal for by-product, industrial stoker and pulverizer use from Wyoming Co., W. Va., on the Virginian Ry.

ANTHRACITE

Hazel Brook—*Premium Lehigh*
Raven Run—*Premium Mahanoy*
Cross Creek—*First Grade Lehigh*

Our engineering service, available upon application, and long and varied experience is your assurance of the Right Coal — Properly Applied.

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Three

waste water problems solved by

GRAVER REACTIVATOR

Here was a particularly difficult problem of high solids in waste water in a large eastern process plant.

This waste water contains up to 1500 ppm of suspended solids and 3000 gpm were to be treated. The problems were:

(1) to prevent stream pollution,

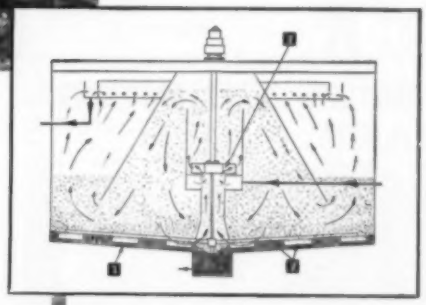
(2) to produce solids of the highest concentration for disposal,

(3) to recover clear water for process use.

A Graver Reactivator was selected to solve this multiple problem. The Reactivator is doing the job so effectively that it delivers solids up to 14% by weight while producing an effluent suitably clear for recycling in the system, *without any chemical treatment.*

In plants all over the country, Graver Reactivators are effectively and economically treating raw water supplies and conditioning waste waters for reuse or for trouble-free disposal. These units can solve *your* liquid conditioning problem, too. Their distinctive design is described in Bulletin WC-103.

Write today for a copy and for free technical paper, "Some Economic Factors in Waste Water Treatment".



Three exclusive Graver Reactivator Features

1. *Full bottom area for solids concentration and collection.*
2. *Separately driven highly efficient sludge scraper and blades.*
3. *Positive and intimate contact of incoming water with sludge by variable speed sludge recirculation impeller.*

GRAVER WATER CONDITIONING CO.

Division of Graver Tank & Mfg. Co., Inc.

DEPT. SPI-R, 214 WEST 14th STREET, NEW YORK 11, N. Y.

GRAVER

GW 489

Lock Joint Pipe Co.—S. C.

Erection of a new plant that will manufacture prestressed concrete pressure pipe has just been completed at COLUMBIA, S. C., by the LOCK JOINT PIPE CO., of East Orange, N. J.

The plant includes seven standardized steel-frame structures designed by LURIA ENGINEERING CORP. The largest of the building units, consisting af a main structure covering 7,000 square feet and a long lean-to covering 12,000 square feet, will be employed for cranes. The second largest building, with 14,000 square feet, will be a shop for the fabrication of steel cylinder. A third building will be devoted to wrapping prestressed wire on concrete cores, with a fourth for laboratory and cement storage. Two other buildings, one designed for a three-ton crane and the other for a one-ton crane, will be employed for the manufacture of special pipe and for wire storage. The seventh building will be a miscellaneous storage building for stocks, materials and tools.

Better Light Better Sight Bureau Elects S. L. Drumm

S. L. DRUMM, Vice President in charge of sales, New Orleans Public Service Inc., New Orleans, La., has been elected Chairman of the BETTER LIGHT BETTER SIGHT BUREAU. Mr. Drumm succeeds Ralph P. Wagner, Commercial Manager, Eastern Division, Niagara Mohawk Power Corp., Albany, N. Y., who has been Chairman of the Bureau since 1948.

S. L. Drumm, New Chairman of the Better Light Better Sight Bureau, and Vice President in charge of sales, New Orleans Public Service, Inc.

Widely known in the electrical industry, Mr. Drumm has served on several committees of the Edison Electric Institute and is the immediate past Chairman of the General Sales Section, Southeastern Electric Exchange. He has been associated with New Orleans Public Service in various capacities for 28 years.

Texas Industrial District

THE MISSOURI-KANSAS-TEXAS RAILROAD recently announced the opening of one of the largest restricted industrial districts in the Southwest, to be located in the Farmers Branch Area adjoining the northern city limits of DALLAS, TEXAS.

The new industrial district will provide sites for both heavy and light industries and will be restricted to provide for industrial buildings of modern design and construction, broad expansive streets and landscaped lawns. Restrictions provide for masonry construction, uniform set backs from the highway and streets, with rail and truck entrances to be from the rear or side. It will be served exclusively by the Katy Railroad.

CARECO ONE-PIECE FURNACE LINING
Reg. U.S. TRADE MARK Pat. Off.
For REPAIRING or LINING
A PLASTIC LINING USED IN PLACE OF FIRE BRICK

LONGER LASTING BOILER FURNACES

Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.

CAROLINA REFRACTORIES COMPANY
HARTSVILLE, S. C.

AUDELS ENGINEERS LIBRARY

For all Stationary, Steam, Diesel, Hoisting and Operating Engineers, Firemen, Water Tenders, Oilers, Boiler Operators, Repair Men & Applicants for Engineer's and Firemen's License Examinations.

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$9 COMPLETE POSTPAID . . . . . PAY ONLY $1 A MONTH

POWER BILLS CUT!
New Wiring Avoided!

As proved in thousands of installations, Sprague Power Factor Capacitors installed *right at each piece of inductive electrical equipment* insure maximum power cost savings, guarantee maximum cost-saving flexibility for future moves and expansion. Power factor on each piece of equipment is corrected *to the maximum*. Changes or additions can be made as *they are required*. New wiring, new switch gear, new transformers can be avoided. *Existing electrical circuits can handle bigger loads.*

Write for 28-page POWER FACTOR CORRECTION GUIDE
SPRAGUE ELECTRIC COMPANY, North Adams, Mass.

SPRAGUE POWER FACTOR CAPACITORS

IT'S PACKED WITH SATISFACTION WHEN IT'S PACKED WITH R/M

In the widely diversified line of Raybestos-Manhattan packings and gaskets, you will find products specially made to solve your toughest packing problems. Let your nearby R/M distributor help you specify the packings that will assure you of long trouble-free operation. Give him a call today.

R/M **PACKINGS**

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Crawfordsville, Ind.; Passaic, N.J.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Manufacturers of Packings • Asbestos Textiles • Mechanical Rubber Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Sintered Metal Products • Bowling Balls

news for the South and Southwest (continued)

Cooper-Bessemer—New Orleans

A combined regional office and warehouse has just been established at NEW ORLEANS by THE COOPER-BESSEMER CORPORATION. Operating under the direction of Mr. T. E. KRANER, branch manager, the new district facilities located at 1410 South Jefferson Davis Parkway, provide direct factory representation for all engineering service requirements on engine and compressor applications. In addition, the new warehouse stocks essential parts for servicing marine and industrial installations currently operating in the Southern Gulf Coast area. Working directly with Mr. Kraner is Mr. F. A. GEHRES, assistant branch manager.

Mr. Kraner has been associated with this engine and compressor builder since 1937 when he first started in the engineering department at the headquarters plant in Mount Vernon, Ohio. In 1940, he was assigned to the Washington office. In 1946, he was reassigned to the company's Caracas, Venezuela, office as branch manager, where he was responsible for engineering gas, gas-diesel engines and compressors used on pipe lines, refineries and chemical plants.

Mr. F. A. GEHRES started with Cooper-Bessemer in 1939 as application engineer before being assigned to its district office at HOUSTON, TEXAS. In the war years he was stationed at the Navy parts depot in Harrisburg and later served as an officer in the South Pacific. During his service at Houston, he engineered the installation of compressors and engines on cross-country pipe lines as well as in petroleum processing plants and diversified industrial applications.

Personnel Changes at Gulf States Utilities

R. J. ROBERTSON of BATON ROUGE, LOUISIANA, formerly superintendent of Production of GULF STATES UTILITIES COMPANY'S Louisiana generating facilities, was promoted to superintendent of production in one of several changes involving production department personnel. Other changes include the promotion and transfer of R. H. LAWTON, former superintendent of Riverside Station at Lake Charles, Louisiana, to superintendent of Neches Station near BEAUMONT, TEXAS. L. R. EDDINS, former chief engineer at Neches Station was promoted to fill the superintendency at Riverside. W. A. WHITTEN, former electrical maintenance supervisor of Texas production facilities, was promoted to the chief engineer's post at Neches Station. L. L. HIRSCH was given general supervision of diesel units in the company's Texas service area.

Homestead Valve Appointments

HOMESTEAD VALVE MANUFACTURING COMPANY, Coraopolis, Pa., has appointed DON H. KREY as vice president in charge of sales, and JOHN W. FORCE as vice president in charge of engineering. Both appointments are effective for all of the company's three divisions, which include the valve plant, the Hypressure Jenny steam cleaner plant, and the chemical compounding plant in Edgeworth, Pa.

PIPING PROJECT?

You Can Specify

CORRIGAN COMPANY

*with Confidence!**

As do electric power utilities, prominent paper box board manufacturers, chemical companies, breweries, etc.

CONTRACTORS FOR:
PIPING
HEATING
PLUMBING
AIR-CONDITIONING
SPRINKLER SYSTEMS

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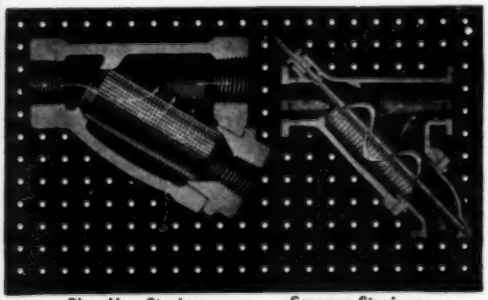
CORRIGAN CO. EST. 1894 ST. LOUIS

[illegible] ST. LOUIS AVE. • ST. LOUIS 6, MO.



Pipe-Line Strainer *Scraper Strainer*

Strainers protect steam traps, regulating and reducing valves, pumps, meters or nozzles. Also, keep impurities out of fluids of all kinds. Available with scrapers for operation without interruptions for cleaning screens. Catalog Nos. 1200 and 1225.

SARCO
PIPE LINE
STRAINERS

293

SARCO SAVES STEAM

SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

TODAY...

We're all in the steel business!

FOR EACH OF US TO *GET* MORE STEEL . . . AND PRODUCTS MADE OF STEEL . . .
WE'VE GOT TO *PROVIDE* MORE SCRAP TO *MAKE* THE STEEL.

Half the melting stock used in the steel mill or iron foundry consists of iron and steel scrap. In normal times, enough scrap is produced by the mills, foundries, railroads, fabricators and scrap dealers to fill the need.

But now the mills have stepped up capacity to meet the greatly increased military and civilian demands for steel. And that increased capacity has outstepped the supply of scrap.

That is why we are calling on plants in both metal-working and NON-METAL-WORKING industries to provide the needed scrap NOW.

You have the heavy scrap needed to make more steel

Enough obsolete machinery, equipment and parts are being carried as useless inventory to give a big push to the production of steel. Surveys have proved this.

The trick is to get that old steel into the hands of the steel producers.

We're putting that job up to you.

To help maintain steel production... provide more steel for the equipment you want . . . turn in your idle iron and steel to your local scrap dealer.

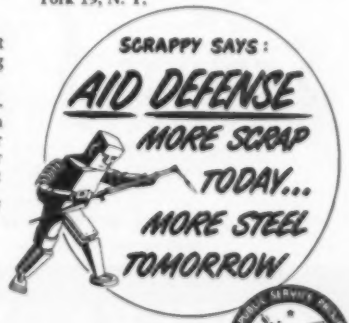
What you can do to help maintain steel production

1. Appoint one top official in your plant to take full responsibility for surveying the plant and getting out the scrap.

2. Consult with your local Scrap Mobilization Committee about its program to help out in the scrap crisis. For chairman's name, check with your Chamber of Commerce, or the nearest office of the National Production Authority, Department of Commerce.

3. Call in your local scrap dealer to help you work out a practical scrapping program. Non-ferrous scrap is needed, too.

4. Write for free booklet, "Top Management: Your Program For Emergency Scrap Recovery", addressing Advertising Council, 25 W. 45 St., New York 19, N. Y.



This advertisement is a contribution, in the national interest, by

SOUTHERN POWER & INDUSTRY

Weir Kilby Corp.—Birmingham

An expansion program to increase its capacity by 20 per cent was announced recently by the WEIR KILBY CORPORATION, BIRMINGHAM, ALABAMA, affiliate of the TAYLOR-WHARTON IRON AND STEEL COMPANY of Cincinnati.

The Weir Kilby Corporation, manufacturers of frogs, switches, guard rails and other railroad track accessories, will utilize about 7000 tons of steel a year when the program is completed some time in February, according to HOWARD VAN SYCKLE, local plant manager.

Weir Kilby's expansion program includes an addition to its main building of some 5400 square feet, installation of three heavy planers, a 30-foot spindle rail drill, an Ingersoll plate milling machine, one of a few in existence, and the latest material handling equipment.

Architect for the new addition is Strickland and Associates of Birmingham. General contractor is J. F. Holley, and steel erection work is being done by Ledbetter Erection Company, both of Birmingham.

Luscombe Expands—Dallas

A $450,000 building program which will add more than 80 per cent to the permanent building area of LUSCOMBE AIRPLANE CORPORATION, DALLAS, TEXAS, was announced recently.

Three contracts under the new program already have been let to the Erwin-Newman Company of Houston, Texas. These call for a South extension to the main factory building; a North extension to the process building, and a North extension to the main factory building. Fabrication of all three buildings is scheduled to start immediately at Erwin-Newman's Oklahoma City plant. All buildings are scheduled for final completion by July 1.

Air Reduction—Shreveport

JOHN LUND has been appointed District Manager of AIR REDUCTION MAGNOLIA COMPANY a Division of AIR REDUCTION COMPANY, INC., New York. With headquarters at SHREVEPORT, LOUISIANA, Mr. Lund will have sales responsibility for the Shreveport District.

John Lund, Dist. Mgr., Air Reduction, Shreveport.

Formerly Mr. Lund was Assistant Manager at Shreveport under Mr. H. T. Wadley and is thoroughly familiar with the company's operations in the LOUISIANA, ARKANSAS and EAST TEXAS territories served by this company. Mr. Lund joined Air Reduction in the Technical Sales Department in 1927.

BLAW-KNOX GRATING

Electroforged into rigid, one-piece panels.

Twisted cross bar prevents slipping.

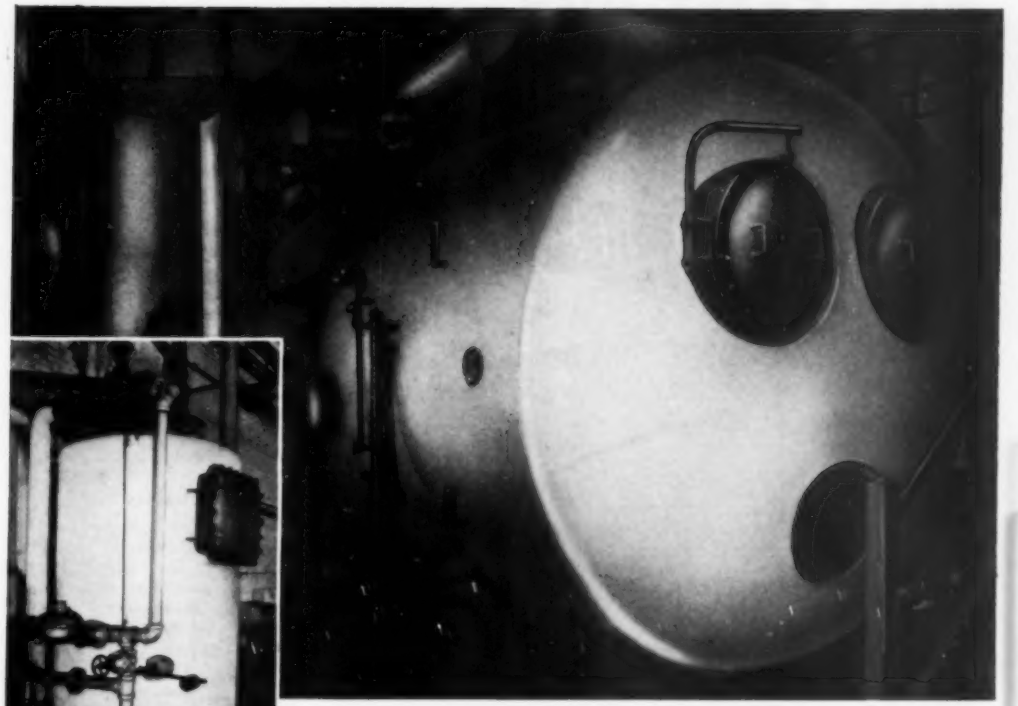
...GIVES BETTER SERVICE ON 5 COUNTS

1 SAFER FOOTING
2 GREATER STRENGTH
3 LONGER LIFE
4 LOWER MAINTENANCE
5 MORE OPEN SPACE

Bring your open steel flooring problems to Blaw-Knox for expert help. Bulletin 2365 sent on request.

Grating Department
BLAW-KNOX DIVISION of Blaw-Knox Company
2034 Farmers Bank Bldg., Pittsburgh 22, Pa.

BLAW-KNOX *Electroforged* STEEL GRATING



A Big Help

on small—as well as big—deaeration jobs

Small deaerators are big business at Worthington! That's why the plant with small-capacity requirements will benefit by getting acquainted with the complete range of Worthington deaerating equipment.

Worthington Gives You All Types, All Sizes

Worthington deaerating heaters and deaerators are built in sizes to handle from a few thousand pounds an hour to over a million. They are tailor-made to fit the particular requirements of each job. Special designs are available for operation with scale-forming water.

Both tray and steam-jet types are made—with external surface-type vent condensers or internal direct-contact vent condensing. They can be furnished for any practical operating pressure—constant or variable—or for vacuum operation.

With a complete range of sizes and types at their fingertips, Worthington engineers can competently recommend the design best suited to *your* requirements.

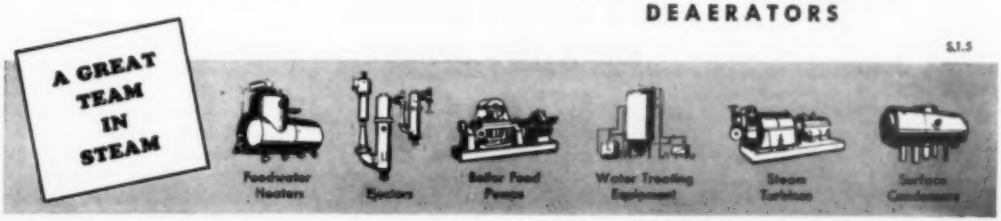
Remember, too, Worthington designs are backed by over 50 years experience in the design and manufacture of direct contact feedwater heaters and over 100 years experience in hydraulic machinery.

Send your water treating problem to Worthington Pump and Machinery Corporation, Steam Power Division, Harrison, N. J.

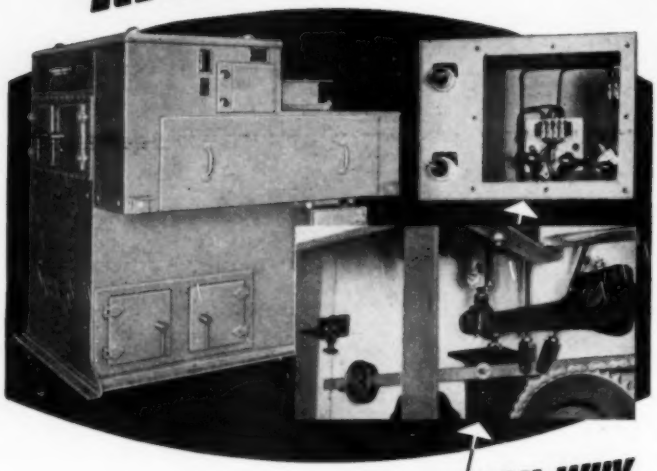
WORTHINGTON

DEAERATORS

S.I.5



YOU CAN'T BUY A BETTER COAL SCALE THAN A RICHARDSON



..AND HERE'S ANOTHER REASON WHY..

WIRING AND CONTROLS OUTSIDE COAL CHAMBER

All electrical wiring and controls are outside the coal chamber. The sulphuric-acid-laden air and dust of the coal chamber can never harm a Richardson Coal Scale because of this fact. In all ways—in all aspects of design and construction—sound, foresighted, time-proved Richardson engineering is your assurance that the dependability, accuracy, and ruggedness built into the Richardson Scale will be maintained for the life of the unit. Richardson inspection and service are available nationwide.

RICHARDSON SCALE COMPANY
Clifton, New Jersey

Atlanta • Boston • Buffalo
Chicago • Cincinnati • Detroit
Houston • Minneapolis • New York
Omaha • Philadelphia • Pittsburgh
San Francisco • St. Louis • Wichita
Montreal • Toronto

Write for bulletins, and remember . .

YOU SPECIFY QUALITY WHEN YOU SPECIFY

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

8370

news (continued)

B&W Appoints Carl—Miss.

The appointment of CLAYTON CARL as superintendent of the WEST POINT, MISS., works of THE BABCOCK & WILCOX COMPANY has been announced.

A. P. CRAMP, company plant engineer, who came to West Point last summer for the purpose of directing construction of the new plant, will remain in charge of that operation until it is completed.

Mr. Carl has been with B&W since 1918, and has been engaged in the fabrication of sheet and structural work at the Barberton, Ohio, plant, except for a brief period in the drum shop there. In 1935 he became assistant foreman in the sheet and structural shop and was made foreman in 1947.

Titeflex Electronics Div.

TITEFLEX, INC., of Newark, New Jersey, manufacturers of flexible metal tubing and aircraft ignition harnesses, announces the establishment of an "Electronics Division" to coordinate the manufacture and sale of flexible and rigid waveguides, electronic parts and special equipment.

Robert G. Brazenor will direct the new division and William W. Buckley will assist as electronics sales supervisor; the division will remain under overall direction of Titeflex sales management. James Nickerson and John Bales, specialists in electronics equipment, have joined the staff as sales engineers.

Carbide & Carbon—Texas

Construction of a major unit for the production of polyethylene resins has just been announced as an addition to the TEXAS CITY plant of CARBIDE AND CARBON CHEMICALS COMPANY, a Division of UNION CARBIDE AND CARBON CORPORATION.

The Certificate of Necessity for this construction has just been granted by the National Production Authority, and appropriate government agencies are now co-operating in getting the other necessary priorities for construction materials and equipment. With this assistance, construction will begin immediately. The unit is expected to be in production by early 1953.

The production process will involve the direct polymerization of ethylene at high pressure. The resulting "solidified" material will be in the form of whitish, resin granules.

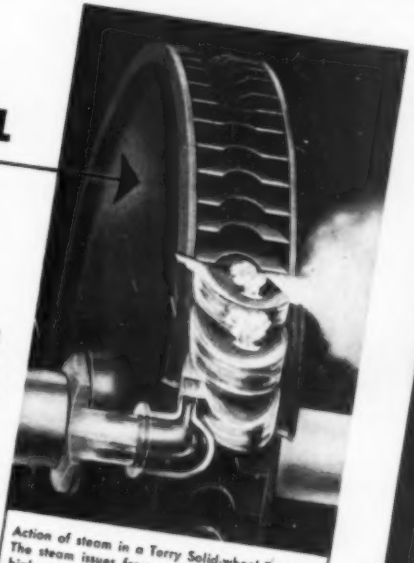
TERRY

THIS TURBINE WHEEL

has no parts to loosen or work out

The rotor of the Terry Solid-wheel Turbine is a single forging of special composition steel, in which a series of semi-circular buckets is milled. There are no separate parts to become loose or work out.

The power-producing action of the steam takes place on the curved surfaces at the back of the buckets. Hence, wear of the blades is of little consequence, as it does not materially affect horsepower or efficiency. There is practically no end thrust since the steam enters and leaves the wheel in a direction at right angles to shaft.



Action of steam in a Terry Solid-wheel Turbine. The steam issues from an expanding nozzle at high velocity and enters the side of the wheel bucket where its direction is reversed 180°. As this single reversal uses but a portion of the available energy, the steam is caught in a stationary reversing chamber and returned again to the wheel. This process is repeated several times until practically all of the useful energy has been utilized.

This is only a small part of the story of the many advantages of the Terry Solid-wheel Turbine. Write for complete details.

THE TERRY STEAM TURBINE CO.

TERRY SQUARE, HARTFORD 1, CONN.

TT-1109

Memo

Send for a copy of bulletin S-116 which describes the many advantages of the Terry Solid-wheel Turbine.

TUBES FOR BENT AND STRAIGHT
TUBE BOILERS
COIL AND SPECIALTY BENDING
IDEAL FLUE TOOLS
STEEL AND COPPER FERRULES

C

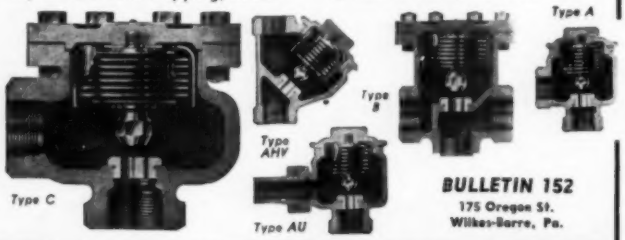
BOILER TUBE CO. OF AMERICA
McKEES ROCKS, PA.
(Pittsburgh District)

PITTSBURGH
CHICAGO

FRED S. RENAULD & CO.,
LOS ANGELES

Nicholson Traps Help
CUT STEAM COST
$500,000 A YEAR

At one of the nation's large processing plants a campaign to promote economical steam use by improving heat transfer efficiency has resulted in a yearly saving of $500,000. Credit for a fair portion of this is given to improved steam trapping, which resulted from the installation of Nicholson thermostatic traps. To see why an increasing number of leading plants are standardizing on Nicholsons for positive drainage and faster heat transfer, send for Bulletin 152.



BULLETIN 152
175 Oregon St.
Wilkes-Barre, Pa.

W. H. NICHOLSON & CO.
TRAPS · VALVES · FLOATS

news (continued)

B&W Promotes Nielsen

THE BABCOCK & WILCOX COMPANY, has announced the election of M. NIELSEN as an assistant vice president of the company. He will report directly to C. H. GAY, vice president in charge of manufacturing, and will assist Mr. Gay in the operations of all of the company's plants in the boiler division, including the new plants at WILMINGTON, NORTH CAROLINA, and WEST POINT, MISSISSIPPI. Mr. Nielsen's headquarters will be at Barberton, Ohio.

New ICA Plant—Va.

INSTRUMENT CORPORATION OF AMERICA, BLACKSBURG, VIRGINIA, recently opened a new plant housing facilities for the exclusive production of miniature slip-ring and commutator assemblies. This plant is now in full scale production. Modern improvements are incorporated to produce these products to precision standards in the fastest possible time at lowest possible cost.

ICA assemblies are produced under exclusive license by Electro Tec Corporation. They are manufactured by molding plastic blanks to the exact size and shape required, after which hard silver rings are electro-plated into the machined grooves. Final machining produces a one-piece assembly of extreme accuracy.

A-C—South Central

Newly assigned as sales representatives to ALLIS-CHALMERS general machinery division district offices in south central areas are HUGH C. BLAIR, JOHN O. HIGGINS and RICHARD D. MILLER.

Blair, an application engineer in Allis-Chalmers transformer section for the last eight months, has been assigned to the company's NEW ORLEANS district office. He is a 1949 electrical engineering graduate of Louisiana State University and is a member of the American Institute of Electrical Engineers.

Higgins, a 1949 mechanical engineering graduate of Vanderbilt University, has been named to the firm's HOUSTON district office. He is a member of the American Society of Mechanical Engineers.

Miller, who was graduated in 1950 from Georgia Institute of Technology with a degree in industrial management, has been assigned to the BIRMINGHAM district office.

Permutit Appointment—N. C.

THE PERMUTIT COMPANY, 330 W. 42nd St., New York, N. Y., has announced the appointment of CLYDE R. POORE as Assistant Sales Engineer for its Sales Office located at 831 E. Morehead Street, CHARLOTTE 3, N. C.

In his new capacity, Mr. Poore will work with NORMAN D. DOANE, Sales Engineer, in the sales and service of industrial water conditioning equipment.

With three years' experience in the application of industrial water conditioning apparatus, Poore is well qualified for his new duties. Born in Middleboro, Kentucky, he received his bachelor's degree in Chemistry from Guilford College, Guilford College, North Carolina.

ARO—Tennessee

Major General THOMAS F. FARRELL, Assistant General Manager of the U. S. Atomic Energy Commission since August, 1951, has resigned to become Managing Director of ARO, Inc., which manages and operates the ARNOLD ENGINEERING DEVELOPMENT CENTER at TULLAHOMA, TENNESSEE.

Allis-Chalmers—Southwest

JOE C. POHLMAN has been named application engineer in ALLIS-CHALMERS transformer section in charge of regulator sales for the southwest and central regions, according to an announcement by G. W. CLOTHIER, manager of the section.

Pohlman came to Allis-Chalmers in 1950 following graduation as an electrical engineer from Kansas State College. He recently completed the company's graduate training course and has done study work in connection with the Illinois Institute of Technology graduate program.

Commercial Solvents—La.

COMMERCIAL SOLVENTS CORPORATION has awarded a contract for the construction of additional ammonia and methanol production units at STERLINGTON, LOUISIANA, to Ford, Bacon and Davis Construction Corporation, Monroe, La., it has been announced by Maynard C. Wheeler, Vice President in Charge of Production and Engineering.

The expansion program, which will cost approximately $20,000,000, will double the plant's present production of ammonia and methanol. Construction is to begin immediately, and it is expected that the additional units will be in operation by January, 1953.

DART

...the Union that is its own Best "Replacement"!

(YOU CAN USE ONE OVER AND OVER AGAIN)

Yes, you can take a Dart off one installation and put it on another. Or put it back on the same installation—time after time. That's economy!

Here's why you can get so much work out of a Dart:

- ***Drop-Tight Yet "Easy Does It"***
  Dart's spherically ground seats provide a wide, full bearing surface that requires a minimum of nut take up. Excessive wrenching (hard on metal and man) isn't required. What's more, a Dart *stays* tight.

- ***Non-Corrosive Bronze Seats***
  Why do they use bronze for memorial plaques? Because it *lasts!* That's why *we* use this non-corrosive metal for protection of seats against pitting and corrosion.

- ***Practically Indestructible Nut and Ends***
  Air refined malleable iron is tops for resistance to stress, stretching and wrenching. That's why we use it for Dart nuts and ends.

Test a Dart on your next job. You'll *like* its quicker, easier action — you'll *save* by its longer working life!

DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co. — Distributors
Boston New York Pittsburgh

DART
UNIONS

news for the South and Southwest (continued)

Chemstrand Plants — Decatur, Pensacola

M. H. McDOWELL is in charge of procurement for the Chemstrand nylon plant under construction at PENSACOLA, FLORIDA. The plant is being designed by E. I. DU PONT DE NEMOURS & COMPANY, INC., Wilmington, Delaware.

Mr. McDowell works under the direction of ROY G. HEMMINGHAUS, nylon plant manager for THE CHEMSTRAND CORPORATION. S. WILLIAM GINTHER, who has been a procurement coordinator on the company's Acrilan project at DECATUR, ALABAMA, has been transferred to the Wilmington offices to assist Mr. McDowell from that point.

Chemstrand currently is engaged in two construction projects—its administrative headquarters, research and development center and Acrilan acrylic textile fiber manufacturing facilities at Decatur, and the Chemstrand nylon plant on which ground recently was broken north of Pensacola.

Mr. Hemminghaus, FRED G. GRONEMEYER, nylon project engineer, and the Chemstrand nylon team are temporarily headquartered in Wilmington, working with du Pont nylon personnel in keeping with license provisions whereby du Pont trains Chemstrand personnel and also designs and builds Chemstrand's nylon plant.

Allis-Chalmers—Tulsa

THE ROACH EQUIPMENT MANUFACTURING COMPANY, 823 West 23rd Street, TULSA, OKLAHOMA, has been named a distributor for ALLIS-CHALMERS motors and transformers in Tulsa, Washington, Kay, Seminole, and Creek counties. M. L. ROACH is owner of the company.

Sylvania—North Carolina

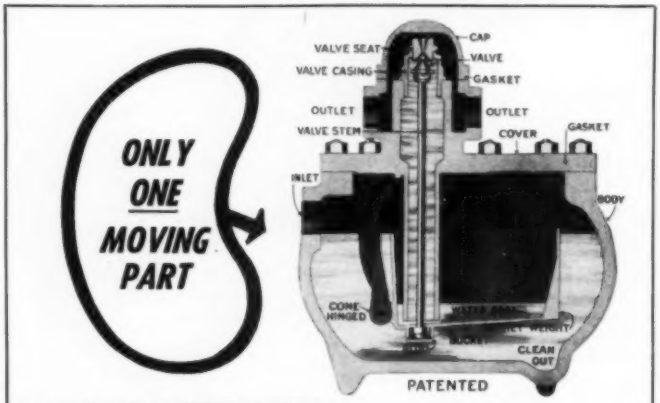
SYLVANIA ELECTRIC PRODUCTS INC. announced recently it had contracted to purchase the cabinet plant of the BLAIR PARK FURNITURE MFG. COMPANY at HIGH POINT, N. C., to produce cabinets for television sets.

Sylvania expects to begin operations as soon as an initial production staff of approximately 200 persons is assembled. With the exception of a few key employees from the Sylvania organization, all employees of the new plant will be from the High Point area. W. HOWARD RODENBECK of the Buffalo plant will be Plant Manager at High Point.

Thompson Products—Dallas

THOMPSON PRODUCTS, INC., Bell, California, has announced formation of its INDUSTRIAL PRODUCTS DIVISION, with branch headquarters in DALLAS, TEXAS. All Thompson engine parts and products for large gas and diesel engines—valves, seats, guides, piston rings, compressor valves and valve seat grinders—used for replacement in the field, will be available.

JAMES D. CREEK, formerly Mid-Continent Division Manager, has been named manager of the new Industrial Products Division. A. S. KING, formerly field engineer, has been advanced to District Manager, Industrial Products Division. ELTON T. BLANTON will work out of HOUSTON as field engineer, and JOHN T. ROSS will act as field engineer from LUBBOCK, TEXAS.



in a Squires STEAM TRAP

Over the long pull, Squires Steam Traps are the LEAST EXPENSIVE to own and operate. These are the reasons why: (1) There is only ONE moving part—the bucket hinge. (2) The larger capacity in both orifice and bucket mean fewer discharges, less wear. (3) You don't have to break main line connections to get at the valve and seat.

You can't beat Squires for economy of operation. It is one steam trap you can INSTALL and FORGET. Write today for complete details. Ask for Catalog No. 100. Write us concerning traps for testing purposes.

IN MANY INDUSTRIES FOR OVER 40 YEARS . . .
DEPENDABLE SQUIRES TRAPS ARE IN DAILY USE

Steel — Pulp & Paper — Meat Packing — Public Utilities — Steam Ship — Distilling — Food Processing — Textile — Oil — Chemical — and many others.

THE C. E. SQUIRES COMPANY
Over 50 Years of Dependability
18532 SYRACUSE AVE. — DEPT. B-1 — CLEVELAND 10, OHIO

Dr. Louis Koenig Joins Southwest Research Institute

DR. LOUIS KOENIG, noted industrial research chemist and executive, has been named an associate director of SOUTHWEST RESEARCH INSTITUTE, SAN ANTONIO, TEXAS.

Dr. Koenig, who was awarded the Doctor of Philosophy degree by New York University, came to Southwest from Stanford Research Institute of Palo Alto, California. While at Stanford, Dr. Koenig, as assistant director of research, was in charge of all activities in chemistry, chemical engineering, air pollution, metallurgy, ceramics, food technology and applied biology.

New Link-Belt Laboratory

Appointment of DR. LAURISTON C. MARSHALL as Director of LINK-BELT COMPANY'S new Physical Testing and Research Laboratory at Indianapolis has been announced.

As Director of the new Laboratory, Dr. Marshall will be responsible for an extensive program of original research, as well as for continuing investigation into ways and means of improving production methods and the quality of conveyor and power transmission products.

Carrier Corp.—Atlanta

MARION H. DARBY has been appointed manager of the Southeastern district of the direct sales division of CARRIER CORPORATION, with headquarters at 300 Ivy St., N. E., ATLANTA, GEORGIA. He succeeds RUSSELL H. GRAY, who has been named executive assistant to WILLIAM BYNAM, executive vice-president. Mr. Gray will be stationed at the headquarters of the air-conditioning and refrigeration manufacturer in Syracuse, N. Y.

Another promotion was that of GEORGE T. LONG, who was appointed sales manager of the dealer sales division, with headquarters in Atlanta.

New B&W Plant—Texas

THE BABCOCK & WILCOX COMPANY has started construction on a new plant in PARIS, TEXAS. This is the third new plant to be announced by the company within a year.

The plant will employ 750 men when it gets into operation this summer, and will manufacture components for large utility and industrial boilers. It will also assemble smaller FM boilers, a new integral unit recently designed by the company.

Total area under roof in the new plant will be 135,000 square feet composed of three bays 500 feet by 90 feet. In addition there will be 1500 feet of uncovered craneway.

TEMCO Promotions

TEXAS ENGINEERING AND MANUFACTURING CO., DALLAS, TEXAS, announces that HERMAN MULLER, previously general foreman, has been named assistant superintendent in charge of night operations. HAROLD B. RIDGLEY, previously assistant superintendent, has been promoted to Tooling Superintendent.

Mr. Muller, a native of Germany, came to this country in 1926, where he has had experience with the Wiedemann Machine Co., Atlantic Refining Co., North American Aviation, Inc., Aero Die and Stamping Co., Aircraftsmen, and Air Products, Inc. He joined TEMCO in 1950, where he has served as foreman and general foreman.

Mr. Ridgley, who was a general foreman with the Texas Division of North American Aviation, Inc., prior to joining TEMCO, has served as assistant foreman, foreman, general foreman, and assistant superintendent with TEMCO before being promoted to his present position. He has been with the company since 1946.

BELMONT
PACKINGS
for WATER...STEAM...OIL...

BELMONT 9 . . . for all hydraulic services from low pressures to extremely heavy duty, hot and cold water.

BELMONT 19 . . . for hot and cold water rods and plungers; low and intermediate steam rods.

BELMONT 30 . . . for high pressure steam rods, expansion joints, air, and gas.

for better sealing—LONGER

Regardless of the temperatures or pressures involved . . . no matter what the lading . . . *your* equipment maintenance costs can benefit from longer, more dependable packing life. If you're *paying* for the best—and you probably are—make sure you *get* it by specifying BELMONT Packings in formulations suited to your particular needs.

Don't make do with the next best—*insist* on BELMONT . . . available in a wide range of materials . . . hundreds of styles and types . . . through distributors everywhere.

For technical assistance on packing specifications, write direct—ask for Catalog #40 or detail your particular problems.

4-M-1

THE BELMONT
PACKING and RUBBER CO.
Butler and Sepviva Streets
Philadelphia 37, Pa.
THERE'S A BELMONT PACKING FOR EVERY SERVICE

JEFFERSON

300 LB.
Trouble Free Unions
for Tough Jobs

JEFFERSON Unions are made of Air Furnace Malleable Iron of an average tensile strength of 55,000 p.s.i., with a yield point of 36,000 pounds and an elongation of 15% in two inches.

Our seat rings are cut from seamless drawn brass tubing, free from all casting defects—sound and uniform always.

They are accurately tapped at all times; are carefully air tested and inspected before shipment, and each and every one approved only if they meet our rigid standards of inspection.

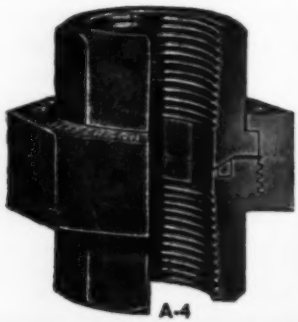
Slightly Higher Priced
But more than worth it.

See these outstanding features—

- ★ A ground ball joint to give leak-proof service
- ★ Octagonal with square corners fits any type of wrench
- ★ No gasket required, hence no maintenance problem
- ★ Hot-dip galvanized to Government Standard for corrosion resistance

Made in all thread sizes from ⅛" to 4" American Standard Taper Threads.

Also manufacture Excel 250 lbs and Master 150 lbs. All unions can be furnished with all-iron seats.



A-4

JEFFERSON
UNION CO.
650 WEST 26th St., NEW YORK 1.
79 GOODING ST., LOCKPORT, N.Y.
45 FLETCHER Ave., LEXINGTON, MASS.

news for the South and Southwest (continued)

Hewitt-Robins South Central

The formation of a new South Central Sales Division of HEWITT-ROBINS INCORPORATED, was announced recently.

L. C. HOLLOMAN has been appointed Assistant Division Manager in charge of the newly created division, which covers TEXAS, WEST TENNESSEE, OKLAHOMA, ARKANSAS, LOUISIANA, MISSISSIPPI and ALABAMA, with headquarters at HOUSTON, TEXAS.

Mr. Holloman joined the organization in 1939, serving first as a salesman in Houston and Tulsa. During World War II, he was manager of self-sealing fuel cell production at Buffalo and later became manager of sales service in the Hewitt Rubber Division. When the Korean war broke out, he was loaned to the Restfoam Division to reestablish fuel cell manufacturing facilities for the armed forces.

Owens-Illinois Glass—S. W.

THE OWENS-ILLINOIS GLASS COMPANY'S KAYLO DIVISION, Toledo, Ohio, recently announced a new organization of its insulation sales force. The plan provides for three regional supervisors. THOMAS F. SEARS will direct insulation sales in the Southwest from offices in HOUSTON, TEXAS.

Allis-Chalmers—Atlanta

EDWARD R. AUSLEY has been assigned to ALLIS-CHALMERS ATLANTA, GEORGIA, district office as an electrical service engineer. Ausley was employed by the FLORIDA POWER CORPORATION before coming to Allis-Chalmers in 1950 following graduation as an electrical engineer from the University of Florida. He is a member of the Florida Engineering Society and of the American Institute of Electrical Engineers.

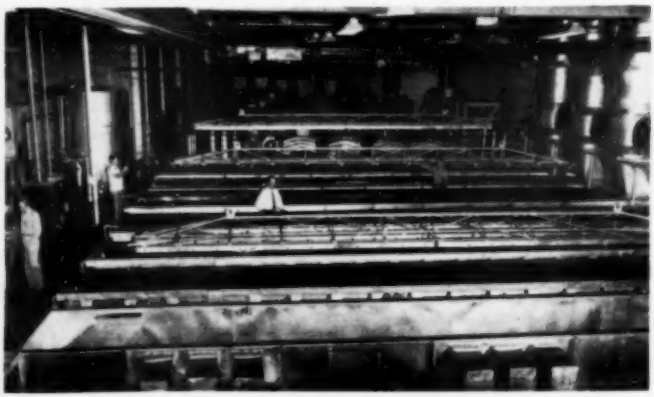
Metal Finishing at Temco Features Centralized Control

WHAT is believed to be the largest anodizing, alodining and chromodizing installation in the Southwest has just been placed in operation at Texas Engineering and Manufacturing Company, Inc., Dallas, Texas.

The TEMCO installation consists of six 5,500-gallon processing tanks, a steam dryer, an overhead bridge crane and a centralized control panel. All tanks are six feet deep with a five and one-half foot solution depth to avoid spillage and internal dimensions are 38 feet in length and three and one-half feet in width.

Four of the tanks—alkaline, cleaner, rinse, anodize and alodine—are ventilated and have an overall external width of six feet, as does the dryer. The other two tanks—rinse and deoxylyte—are not ventilated and have an overall width of four feet each. All tanks have an external length of 39 feet.

One of the most unusual features of the TEMCO set up is the control panel which was designed and fabricated by the TEMCO Maintenance Department, and which provides a single, centralized control for all three processes —anodizing, alodining and chromodizing.



Kramer Joins CSC—La.

JOHN D. KRAMER, chemical engineer of MONROE, LOUISIANA, has joined the Dixie Research Division of COMMERCIAL SOLVENTS CORPORATION.

Mr. Kramer will be situated at the research laboratory of CSC's STERLINGTON, LOUISIANA, plant which is largely devoted to the production of anhydrous ammonia, methanol and anti-freezes.

Westinghouse—Dallas

THE WESTINGHOUSE ELECTRIC CORPORATION has officially opened a new modern sales and warehouse building in DALLAS, TEXAS, to expedite delivery of light bulbs to expanding defense industries in Texas and nearby states.

The red brick structure, located on a 3½ acre plot, provides 29,000 square feet of warehouse floor area, space enough for the storage of some nine million light bulbs. Latest scientific warehousing methods have been incorporated in the building, including electric fork trucks with wooden pallets for loading and unloading cartons of light bulbs.

B&W Tubular Div.—Ch. Engr.

ADIN B. CAPRON has been named chief engineer of the Tubular Products Division of THE BABCOCK & WILCOX COMPANY.

Mr. Capron's headquarters will be at Beaver Falls and he will direct the activities of the drafting, engineering development, maintenance, combustion and methods engineering groups and be in charge of all plant construction.

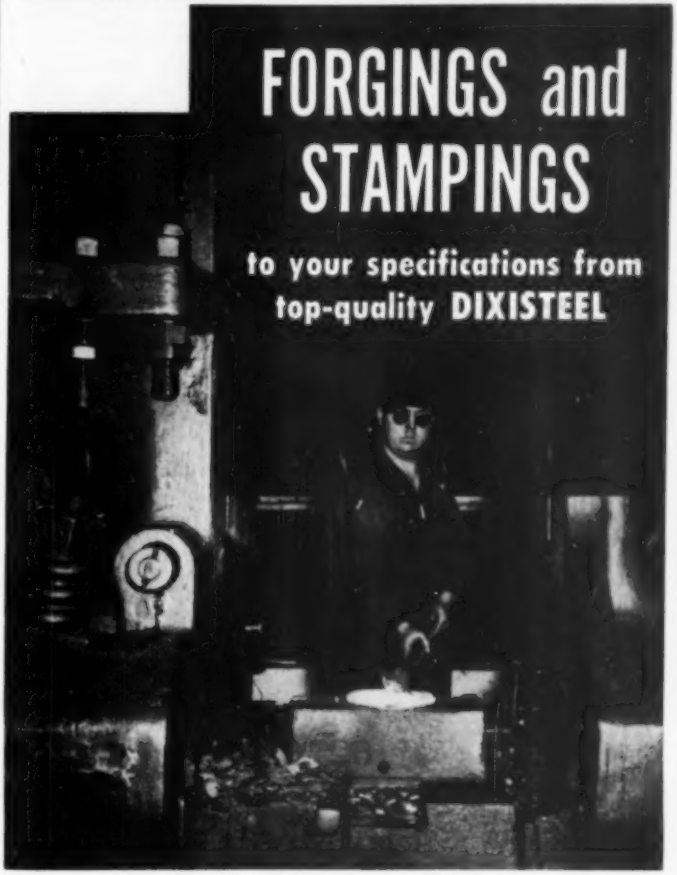
Carboloy—Kansas City

ELLFELDT MACHINERY & SUPPLY, KANSAS CITY, has announced the opening of a new office at 312 Laura St., WICHITA, KANSAS, to supply Carboloy standard tools to industrial plants in that area.

According to HAROLD M. TIDWELL, sales manager, two sales engineers who have attended the cutting tool training school of the CARBOLOY DEPARTMENT of GENERAL ELECTRIC COMPANY in Detroit, are being added to the Wichita staff.

CLAUDE E. WELLS is president of the Ellfeldt organization, which is now in its Golden Anniversary Year. W. L. ENRIGHT is vice president and general manager.

UPSETTING • TRIMMING • THREADING • PUNCHING • HOT-BENDING
BROACHING • DESCALING • HEAT-TREATING • HOT-DIP GALVANIZING



Many manufacturers and fabricators have improved their products, increased production, and cut costs, by using the facilities of our Manufacturing Division.

Blanked and formed parts are produced on the latest type presses, ranging in capacity up to 250 tons, and including a four-slide machine. Closed-die forgings up to 20 pounds are made on modern drop hammers.

Correct chemical and physical properties are assured because forgings and stampings are made from our own, top-quality DIXISTEEL.

It will pay you to look into these facilities. We'll be happy to discuss them with you. Just write us, or call collect, we'll take over from there.

MANUFACTURING DIVISION
ATLANTIC STEEL COMPANY
Atlanta, Georgia • EMerson 3441

YOU'LL lick your cold weather gage problems . . . and cut maintenance hours and costs way down . . . when you install Jerguson Heated Gages. You eliminate gage freezing and breakage, or you can speed up the flow of heavy, sluggish liquids . . . with these gages.

You don't need to insulate, or wrap the gages with tubing, for these modern Jerguson Heated Gages are a completely fabricated unit with built-in steam tracing.

Jerguson Heated Gages are built in both internal tube (illustrated) and external tube models . . . in either reflex or transparent gages. They are available for the pressures you require, in a multitude of sizes, with tapped, flanged, welding socket or other connections.

Jerguson Steam Jacketed Angle Valves, #93 (and #93-U for close hook-ups), used with these heated gages, are available with ball check when required.

Both the gages and valves are available in special materials.

Write us about your problems. Send for new Data on Heated Gages.

JERGUSON

Gages and Valves for the Observation of Liquids and Levels

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Representatives in Major Cities
Phone Listed Under JERGUSON
Jerguson Trees Gage & Valve Co. Ltd., London, Eng.

New Equipment for Southern Industry

(*Continued from page* 112)

Functional Glass Blocks

E-16 PITTSBURGH CORNING CORP., 307 Fourth Ave., Pittsburgh 22, Pa., announces the "Big 3," 12 in. additions to its quintet of 8 in. functional glass blocks for light control in critical seeing areas.

Performance advantages include: a new architectural scale; orientation keyed design, 30% higher light transmittance for north exposures, 20% lower brightness on sunny walls; double cavity design for reduced solar heat gain in summer and greater winter heating economy; face corrugations and face finish for easy installation cleaning, long term maintenance economy; combination possibilities with matching 8 in. functional patterns; and color-coded installation guide marks.

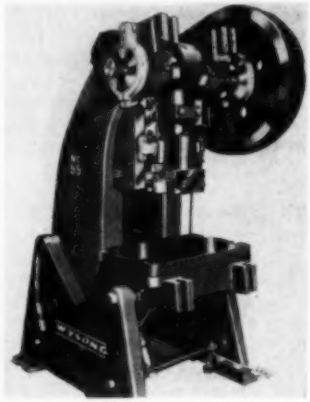
Functional patterns weigh less than 1/3 that of an 8 in. concrete building block, yet provide 12.5% more wall area, are said to have better insulating value, take only ⅓ as much floor space and require no costly surface finishing on the job.

Fifty-Five Ton Punch Press

E-17 WYSONG AND MILES COMPANY, Greensboro, N. C., is marketing a new 55 ton, open back, inclinable punch press.

The square pin type clutch with three points of engagement and built-in non-repeat unit is used. The hardened tool steel wear plates for the clutch pin are replaceable without removing the fly wheel. The cam operation and spring loading of the clutch finger assures complete disengagement of the clutch providing exceptional safety for the operator.

Another feature of the Wysong press is the 12 inch die space. This measurement from bed to slide is taken with stroke down and adjustment up.



V-Belt drive is standard for this Wysong and Miles punch press, but it can be equipped for flat belt, or individual motor drive.

The crankshaft is an alloy steel forging, mounted in bronze lined bearings. Standard brake is split type with spring tensioner. Intermittent brake can be furnished. Slide is hand scraped to insure accurate bearing and is adjustable with ball and socket screw. Knock-out bars are furnished for the slide.

Explosion Proof Varidrive Motor

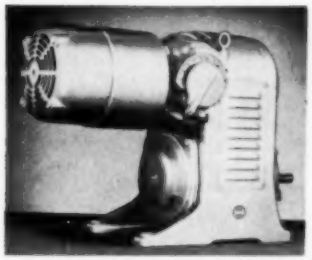
E-18 U. S. ELECTRICAL MOTORS INC., 200 East Slauson Ave., Los Angeles 54, Calif., has developed a combined explosion-proof Varidrive motor which can operate in dangerous locations.

In contrast to the conventional method of connecting an explosion-proof motor with a separate speed

New equipment and methods that improve production only a little are of big value in overall plant economy.

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

Make use of this free SP&I reader service to check on tools, kinks, methods, etc. — big items collectively.

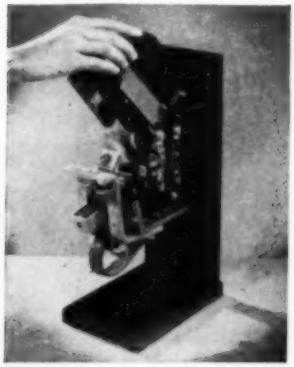


U. S. Electrical Motors' self-contained, explosion-proof Varidrive motor is available in output speeds from 2 to 10,000 rpm in ratings from 1 to 20 hp.

changer, this new design is self-contained, all mounted in one frame, occupying a single base, which saves space and eliminates intermediate connections. The motor element is totally-enclosed and air movement is blasted over the enclosed unit from the exterior by a spark-proof fan housed within the end sector. This motor unit is mounted on the Varidrive assembly.

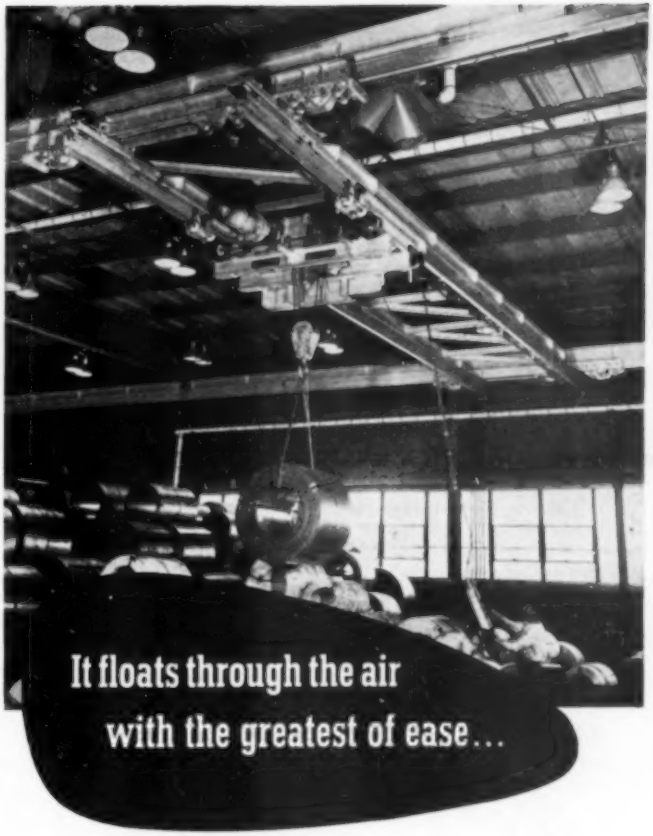
D-C Contactors

E-19 WESTINGHOUSE ELECTRIC CORPORATION, BOX 2099, Pittsburgh 30, Pa., is producing new d-c contactors for steel mill and other heavy-duty industrial applications.



Heavy-duty d-c contactor by *Westinghouse.*

These contactors, known as type M, are accessible from the front. Their alignment is independent of the accuracy of panel drilling, with only three mounting holes required. Contacts and shunts can be replaced easily without the removal of any other parts. Operating coils are re-



when handled by

AMERICAN MONORAIL CRANES

One man easily unloads, stores and moves seven-ton coils of steel with this 10-ton American MonoRail Crane. These cranes furnish efficient operation where low headroom is a critical problem. Interlocking devices permit carrier to travel beyond craneways. Loads are moved over maximum area. Articulated trolleys assure perfect alignment of trucks for smooth crane travel. American MonoRail Cranes are ruggedly built to handle loads up to 10 tons at operating speeds of 500 feet per minute.

Let an American MonoRail engineer tell you about these fast-moving constant-service cranes.

Please write us.

THE AMERICAN MONORAIL COMPANY

13105 ATHENS AVENUE • CLEVELAND 7, OHIO

moved by taking out three bolts. This unit construction reduces maintenance resulting from misalignment of separately-mounted contactor parts.

These contactors feature self-cleaning, knife-edge bearings that are not affected by dust. The design also incorporates a new-type arc box to provide faster arc interruption, and to maintain correct alignment with the moving armature.

Electrical interlocks are mounted directly on the contactor frame and maintain correct alignment with the moving armature. No operating linkages are required. Type M contactors are available in all NEMA ratings from 25 to 2,500 amperes.

Chemical Additive For Handling Leakage Problems

E-20 THE BUILDING MAINTENANCE DIVISION of the FLEXROCK COMPANY, 36th and Filbert Streets, Philadelphia 4, Pa., now has available a liquid chemical additive that makes a fast-acting leak-stopper out of ordinary cement or cement and sand.

Called Flextite, this material regulates the setting time for Portland Cement from 30 seconds to 30 hours,

Flexrock Company's Flexite is a chemical additive that makes a fast acting leak-stopper out of ordinary cement or cement and sand. Will handle leakage problems in elevator pits, engine rooms, tanks, cable pits, etc.

makes it possible to stop direct leaks almost instantly without removing hydrostatic pressure. The mortar is said to be equally effective as a water-resistant plaster coat that seals off seepage and excludes moisture, converting damp, wet basements, pits, etc., into dry work or storage spaces. Flextite mortar is also useful for pointing up spalled areas or covering exposed reinforcing bars or beams. Whether used as a leak-stopper or plaster coat, the mortar works on concrete, masonry or brick surfaces.

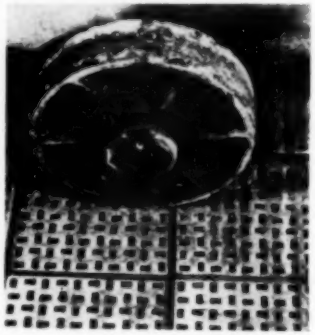
Floor Surface Reinforcement

E-21 ACME STEEL COMPANY, 2840 Archer Ave., Chicago 8, Ill., announces the availability in limited supply of Floor Plate, an 11¾-in. square plate of .068-in. hot-rolled steel designed for the reinforcement and protection of concrete floor surfaces that are constantly subjected to heavy industrial loads and severe punishment.

Floor Plate can be quickly installed as a new floor surface or over old floors. No special tools are necessary for installation. Each plate contains 100 small rectangular holes approximately ½ x ¾ in. and 100 barbed prongs ¾ in. long. These prongs anchor the plate firmly to the concrete 100 times per square foot. The four rounded edges of each plate form a flange that becomes imbedded in the concrete and adds rigidity to the plate. Floor Plate has no sharp edges and cannot work loose.

Area-wise, the surface of a concrete floor reinforced with this plate is 74 per cent steel and 26 per cent concrete. Thus, steel is always under the wheels of traffic protecting the floor surface.

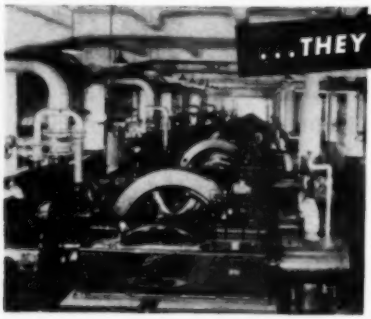
For new floors, after a dry concrete topping mix is poured over the base slab and screeded, the plates are pressed into the topping until pillows



Typical application of *Acme Steel Company's* concrete floor surface reinforcement. Steel of the plate reinforces the concrete surface and provides resistance to wear; abrasive characteristics of exposed concrete provide resistance to slipping and skidding.

LEADING PUMPS AND COMPRESSORS HAVE

Manzel FORCE FEED LUBRICATORS



Worthington Compressors in an automobile plant, with Manzel Model 94 Lubricators

Why it Pays to Select Manzel Lubricators

- THEY LENGTHEN THE LIFE OF MACHINERY
- THEY ARE AUTOMATIC AND TROUBLE-FREE
- THEY ELIMINATE "DOWN TIME"
- THEY CORRECTLY LUBRICATE EACH POINT

● Manzel lubricators supply each wearing point with exactly the amount of oil it needs, and *no more*. Thus they reduce oil consumption as much as 90%.

"Manzels" are furnished as standard equipment on leading makes of engines and machinery. Or they can be installed on your present equipment.

We will gladly have a Manzel lubricator engineer submit recommendations without obligation.

Just write...

Manzel

318 BABCOCK STREET
BUFFALO, NEW YORK

magno-tronic

DUAL SILVER POINT — FULLY AUTOMATIC

FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

REFLECTS THE CRAFTSMANS SKILL

GUARANTEED — FOR ONE YEAR!

This is a glow switch condenserless preheat starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically recycles upon interruption of the lamp circuit.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of starter.

REDUCES COST — Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum lamp life.

VERSATILE — Built to operate efficiently over an extended voltage and temperature range with absolute dependability.

SP-15-30 For use with 15 or 20 watt lamps.

SP-30-40 For use with 30 or 40 watt lamps.

SP-85-100 For use with 100 watt lamps.

Manufactured under U. S. PATENTS

2298236 2239244
2159837 2333694
2339307 2341520
2334935 1849552

Other Patents Pending

INDUSTRIAL ELECTRONICS CORP.
80 BANK STREET, NEWARK 2, N. J.

LINDBERG

wherever metal is processed Lindberg equipment is used — or needed!

Here's a complete line of industrial furnaces, recognized for quality throughout the world: Cyclone Tempering Furnaces—Super Cyclone High Temperature Convection Furnaces—Atmosphere Heat Treating Furnaces—Atmosphere Brazing and Sintering Furnaces—Carbonitriding Furnaces — Atmosphere Generators — Melting Furnaces, Gas, Oil & Electric—Two-Chamber Induction Melting Furnaces—High Frequency Induction Heating Units.

For complete details on Lindberg equipment contact P. J. Duffy; Lindberg Engineering Company, 1170 Pine Ridge Road, N.E., Atlanta, Georgia, Phone: Cherokee 8014—or

LINDBERG ENGINEERING COMPANY
2450 W. Hubbard Street, Chicago 12, Ill.

KIRK & BLUM FUME CONTROL SYSTEM

60%

More Air Less H.P. Lower Cost

Although a conventional duct system would have required as much as 100 H.P., this KIRK & BLUM *ductless* Fume Removal System uses just 40 H.P. to handle 160,000 cubic feet of air per minute . . . doing an excellent job of fume removal at lower initial cost and lower operating cost.

In the plant of this noted stove manufacturer, a battery of ten 8-foot tanks are ventilated by the fume exhaust system shown. Flexibility of capacity is obtained by operation of one or more fans as production requires.

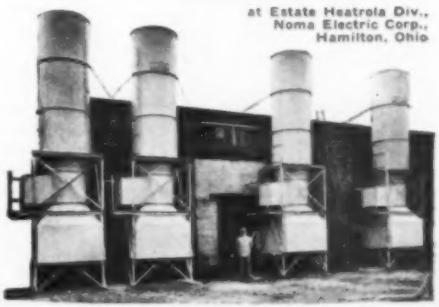
Write for Booklets, "Dust Collecting Systems for Metal Industries," "Fan Systems for Various Industries."

THE KIRK & BLUM MANUFACTURING CO.
3198 FORRER ST., CINCINNATI 9, OHIO

FOR CLEAN AIR . . . THE INVISIBLE TOOL

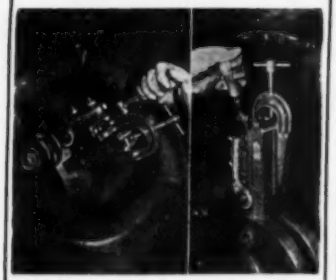
KIRK AND BLUM

FUME CONTROL SYSTEMS



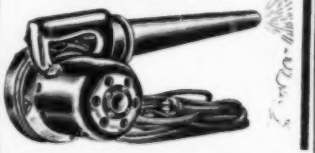
at Estate Heatrola Div., Noma Electric Corp., Hamilton, Ohio

MARTINDALE
COMMSTONE HOLDERS



Hold Commstones rigid and true for concentric resurfacing of commutators and slip rings while running at normal speeds in their own bearings. Interchangeable Boxes 1", 2" and 3" wide handle grinding jobs up to 4¼" wide.

BLOWERS AND VACUUM CLEANERS



MARTINDALE COMMSTONES AND COMMUTATOR GRINDING TOOLS

MICA UNDERCUTTERS FOR SLOTTING COMMUTATORS

Nine Motor Driven Types

MARTINDALE PROTECTIVE MASKS

PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO MAKE PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Weigh less than ½ ounce

Write for 64-page Catalog describing these and many other products for Industrial Maintenance, Safety and Production.

MARTINDALE ELECTRIC CO.
1334 Hird Ave. Cleveland 7, Ohio

of concrete extrude upward through the holes. Plates are then leveled with floor surfaces and each other with 2 x 4 lumber. Finishing, to remove excess concrete, is accomplished with the edge of a steel trowel or a piece of folded burlap to remove excess concrete.

When installing Floor Plate over old concrete floors, the floor must first be chipped to a depth of approximately two inches and a slush bond coat brushed into the chipped surface before the topping mix is poured. After this, the procedure is the same as that for new floors. When sections of industrial floors must be removed to repair plumbing, steam and electrical lines, clogged sewers, etc., any plate or combination of plates can be removed without disturbing the rest of the floor surface.

Books for the Plant Engineer

Flexible Shaft Handbook

PUBLISHED BY THE S. S. WHITE INDUSTRIAL DIVISION
10 East 40th St., New York 16, N. Y.
256 pages.
Available on letterhead request to manufacturer.

This reference manual provides a comprehensive picture of the range and scope of flexible shafts in transmitting power and remote control and gives full details on their construction, selection and application. The Third Edition covers changes and developments that have been made in the flexible shaft field since 1944.

The first and second sections of the Handbook illustrate and describe construction and functions of power drive and remote control flexible shafts. The third section is devoted to the subject of flexible casings which are used in conjunction with flexible shafts. The fourth section provides data on various types of angle adapters and fittings.

Copies of the Handbook are available without charge to designers, engineers and purchasing agents who write the manufacturer on their company letterheads.

Tool Steel Handbook

PUBLISHED BY ALLEGHENY LUDLUM STEEL CORP.
2020 Oliver Bldg., Pittsburgh 22, Pa.
197 pages.
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The volume is prepared for those interested in tool, die and allied steels, and is intended as a companion to the company's "Stainless Steel Handbook," "Strength of Stainless Steel Structural Members as Function of Design," as well as other literature on silicon and electrical steels.

Charts and tables give specific and comparative data on properties, analyses and applications. Detailed descriptions of all important grades follow. Other chapters deal with the many forms and finishes of tool and die steels and such allied products as the sintered carbides. Final sections are comprised of discussions of heat treating and handling techniques as applied to tool and high speed steels and a complete set of weight tables and other useful reference material.

Free copies of the volume will be sent to qualified persons on request to the manufacturer at the above address.

Piping Design-Engineering

PUBLISHED BY GRINNELL COMPANY, INC.
Providence, R. I.
221 pages.
Price, $10.00.

The plan of this book has been to compile in a single publication engineering data and technical information for the use of engineers engaged in the design and application of pressure piping systems hitherto available only by consulting a number of sources.

Subjects covered include: Expansion and Stresses; Velocity and Pressure Drop; Heat Transfer; Allowable S Values; Pressure - Temperature Pipe Graphs; Metallurgical Briefs; Piping Materials; Pipe Fabrication; Pipe Hangers and Supports; and General Tables.

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BY K. G. EMELÉUS
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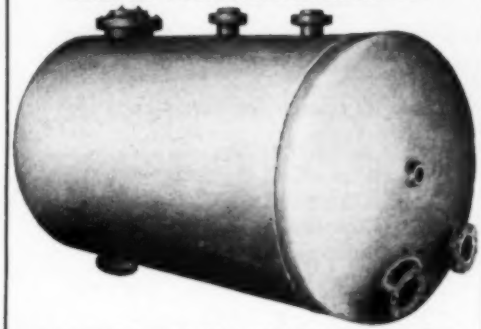

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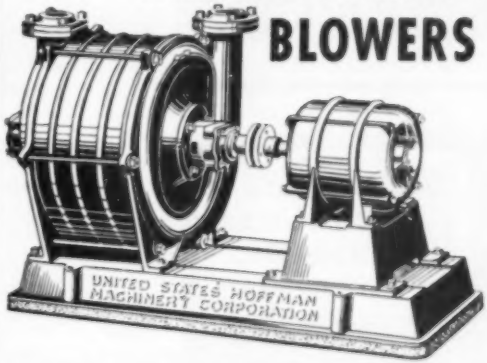

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Catalogs and Bulletins

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Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.

B-10 **SEALS FOR BEARINGS**—Klozure Catalog 10, 100 pages—Illustrates all types of Klozures (oil and grease seals for bearings), describes typical applications and lists sizes and part numbers. Describes in detail mechanical pressure seals for rotary shafts.—GARLOCK PACKING COMPANY, Palmyra, N. Y.

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B-13 **FLEXIBLE METALLIC PACKINGS**—Bulletin, 8 pages—Includes descriptions, service recommendations, and illustrations of "V" metal insert packings, metallic valve stem, plastic core metallic face, all metallic, flexible metallic, high temperature aluminum, and braided copper packings. — RAYBESTOS - MANHATTAN, INC., Packing Division, Manheim, Pa.

B-14 **INDUSTRIAL FLOOR MACHINES**—Bulletin 83.4, 1 page—Tennant Model R Floor Machine is illustrated and described, including design features, operation, applications, and specifications.—G. H. TENNANT COMPANY, 2530 N. 2nd St., Minneapolis 11, Minn.

B-15 **MATERIALS HANDLING**—Folder, 4 pages—Provides complete information on the new Universal Power Booster and Stacker for loading, unloading, stacking, boosting, and horizontal conveying, available in three standard models. Construction and operation are explained. Illustrated with photographs and line drawings. Specifications included.—INDUSTRIAL ENGINEERING & MFG. CO., INC., Brimfield, Ind.

B-16 **PRESSURE CONTROLLER**—Bulletin 16-1, 8 pages— Describes a new non-indicating pressure controller known as the Honeywell Pressure Pilot, and covers principle of operation, specifications, design features, mounting dimensions, and other pertinent information. Illustrated.—MINNEAPOLIS-HONEYWELL REGULATOR CO., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.

B-17 **WIRE ROPE ASSEMBLIES**—Catalog Industrial Standards #5201, 22 pages—Lists wire rope assemblies for machine parts and operating devices; gives detailed specifications for wire rope with fittings permanently attached. Illustrated with equipment photographs and line drawings. —MACWHYTE COMPANY, Kenosha, Wis.

B-18 **PAPER CAPACITORS**—Catalog 21, 24 pages—Shows the various types of capacitors the company offers in accordance with the performance requirements of Joint Army-Navy Specification JAN-C-25, "Paper, Direct-Current, Paper-Dielectric, Fixed (Hermetically-Sealed in Metal Cases)." Intended as handy guide for specifying and buying capacitors.—SPRAGUE ELECTRIC COMPANY, North Adams, Mass.

B-19 **RECIPROCATING PUMP VALVES**—Catalog SC-510, 26 pages—Pump valves, packings, HusHeaters, are described and illustrated. Key features are explained with line drawings and cut-away photographs. Case histories describe applications in an oil refinery, a power plant, municipal water pumping station, and other plants.—SIMS PUMP VALVE COMPANY, INC., 145 Hudson St., New York 13, N. Y.

B-20 **STEAM TRAPS**—Catalog No. 751, 20 pages—Industrial steam traps; radiator traps; expansion steam traps; weight operated steam, air and gasoline traps; combination weight operated-thermostatic steam traps; continuous flow gasoline-water interface traps; piston operated steam traps; and steam, air and gas separators are illustrated and described in detail, with prices and dimensions.—W. H. NICHOLSON & COMPANY, 12 Oregon St., Wilkes-Barre, Pa.

B-21 **STEAM BOILERS**—Catalog, 8 pages—Self-contained boilers for heating and processing are illustrated and described. Typical applications, construction features, efficiency, capacities, and dimensions are discussed.—CLEAVER-BROOKS COMPANY, 304 E. Keefe Ave., Milwaukee 12, Wis.

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B-26 **PIPE TOOLS**—1952 Catalog—Gives pertinent information on three pipe and bolt machines; power units, ratchet threaders; reamers, cutters and other pipe tools in the hand and power classification. Contains Operating Guide. Illustrated.—BEAVER PIPE TOOLS, INC., Dana Ave., Warren, Ohio.

B-27 **COMBUSTION EQUIPMENT**—Bulletin B-11, 28 pages—Discusses design, installation, maintenance, and operation of industrial burners. Lists seven different types of burners and related parts. Includes tables of specifications and equipment photographs and drawings.—C. M. KEMP MFG. CO., 405 East Oliver St., Baltimore 2, Md.

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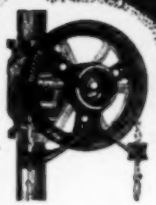

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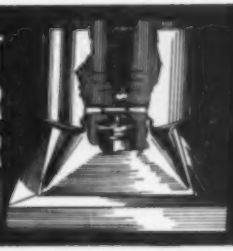

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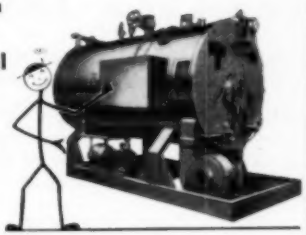

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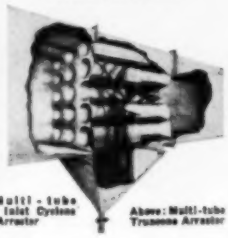
STOP FLY ASH NUISANCE

Left: Multi-tube Guided Inlet Cyclone Arrestor



Above: Multi-tube Truvenne Arrestor

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Other "Whirlex" products include Induced Draft Fans, Controlled Ratio Dampers, Fly Ash Reinjection Systems. Submit your fly ash problems to us. We know the answer. Catalog and additional information mailed upon request.

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BIRMINGHAM, ALABAMA

IN LOUISIANA

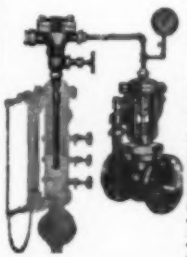
An ATLAS representative writes as follows about boiler troubles in a Louisiana sawmill. After solving the difficulties he says:

"Each boiler was supplied with a

CAMPBELL
Boiler Feed Water Regulator

—in which no floats, thermostats, or generators were involved in the design or construction. A continuous blow down feature was incorporated in the unit."

He concludes:
"The plant now has ample dry steam, with more excess fuel than can be burned under the boilers."



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ATLAS VALVE CO., 275 South St., Newark 5, N. J.
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☐ Damper Regulators
☐ Temperature Regulators
☐ Expansion Joints
☐ Pressure Regulators
☐ Pump Governors
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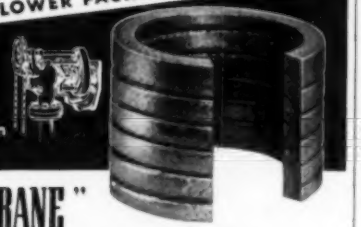
A SOOT BLOWER PACKING PROBLEM

with the RIGHT combination of



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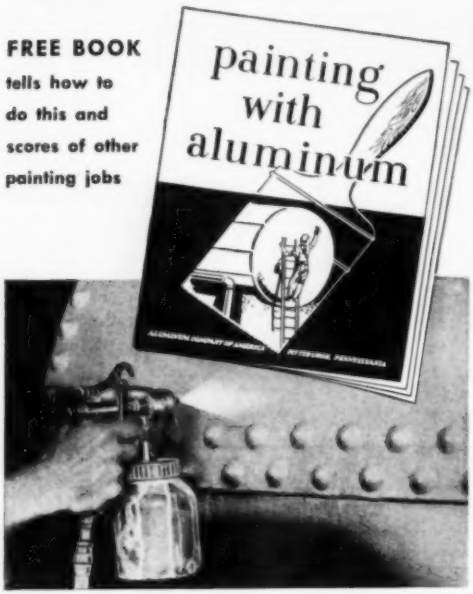

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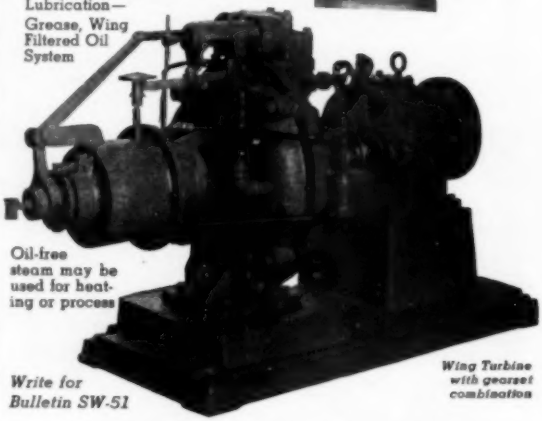

Oil-free steam may be used for heating or process

Write for Bulletin SW-51

Wing Turbine with gearset combination

L. J. Wing Mfg. Co. 169 Vreeland Mills Rd. Linden, New Jersey
Factories: Linden, N. J., Montreal, Canada

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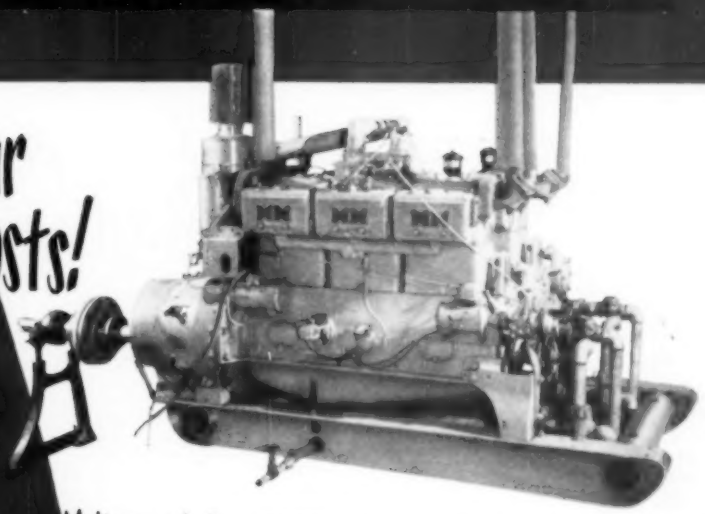
MODERN MACHINERY

Heavy Duty POWER UNITS

Cut your Power Costs!



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MM multi-cylinder design offers grouped engine installations that can be expanded to fit any power requirement at lowest cost. Based on multiples of 6-cylinder units, MM *group* unit parts are interchangeable with MM heavy-duty 4, 6, and 12-cylinder *single* unit parts. The result is streamlined production . . . flexible design that permits a power make-up to exactly suit your needs. As power requirements grow, another MM matched unit can be added to a single engine or group installation. If operating at less than full load, one or more units may be disengaged.

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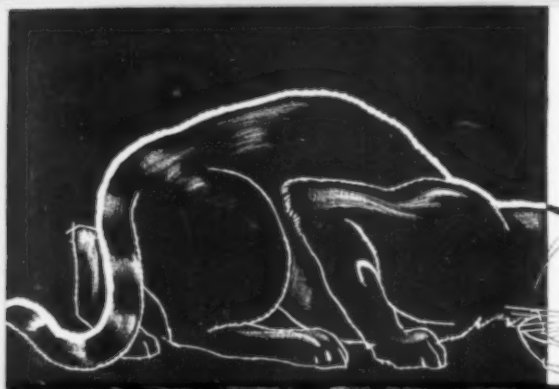
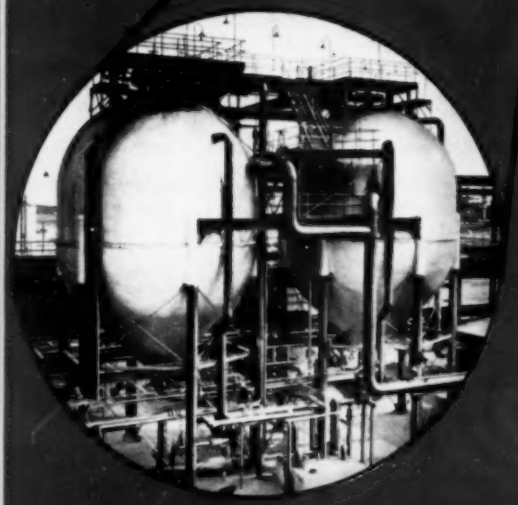
MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA



BIG "CATS" NEED GOOD WATER TOO . . .



Permutit two-stage hot lime soda and phosphate water softener recently installed at The Texas Company's Eagle Point Refinery.

WATER CONDITIONING HEADQUARTERS FOR 40 YEARS

—*and Permutit Equipment brings it, at lower cost, to The Texas Company's new Eagle Point "cat" crackers . . .*

The Texas Company, at their Eagle Point Works in Westville, N. J., processes 60,000 barrels of crude per day, in which processing modern fluid catalytic cracking is used. Over-all refinery steam and electric power balance dictated refinery boiler plant operation at 900 psi. Treated water is used on waste heat boilers on the cat cracker. They operate a Permutit two-stage hot lime soda and phosphate water softener to protect their boilers against scale and corrosion. Permutit equipment and its location are illustrated.

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For aid in the solution of your own water problems, write to The Permutit Company, Dept. SI-4, 330 West 42nd Street, New York 36, N. Y. or to Permutit Company of Canada, Ltd., 6975 Jeanne Mance Street, Montreal.

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